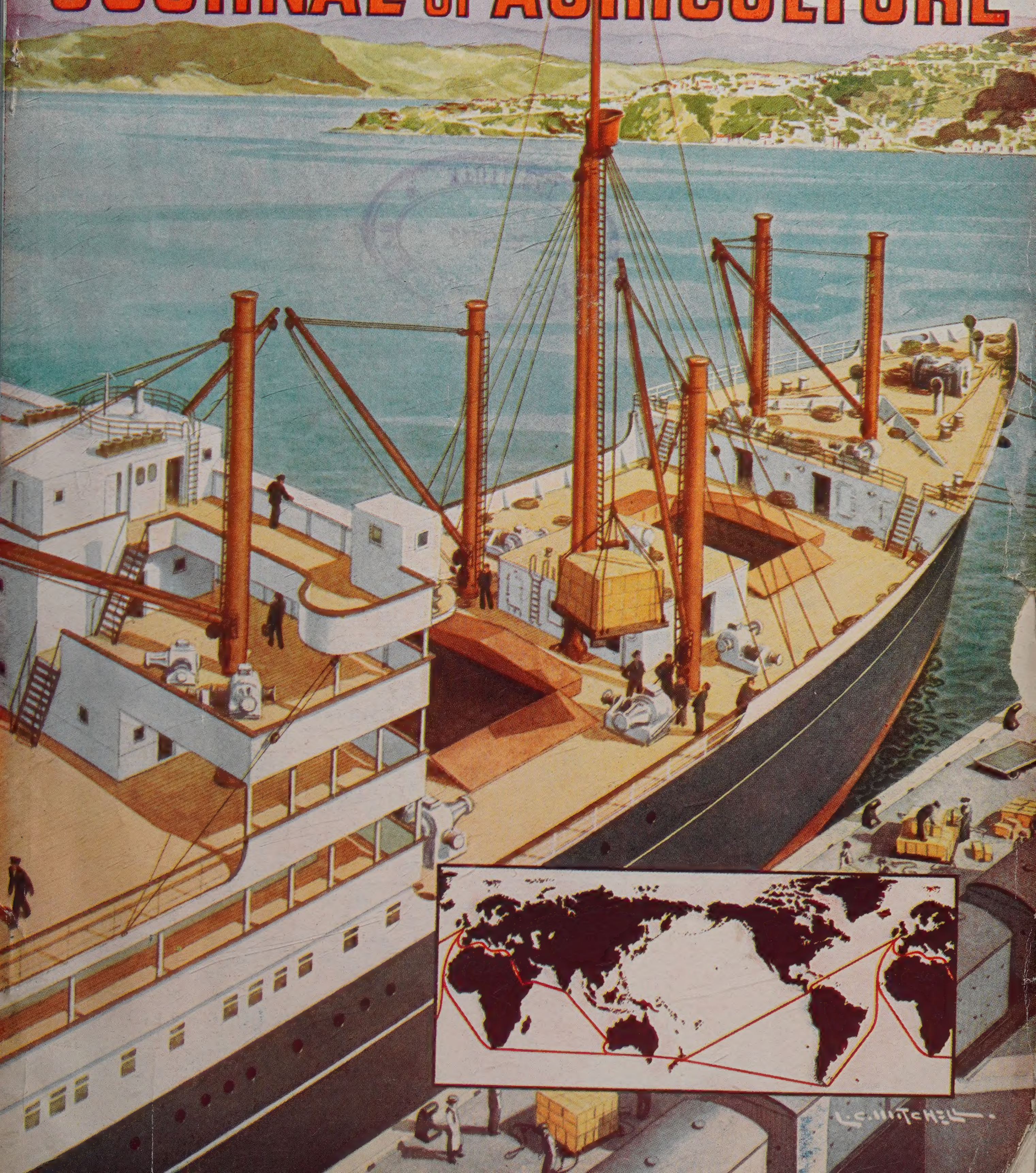
New Zealand
JOURNAL of AGRICULTURE

APRIL, 1946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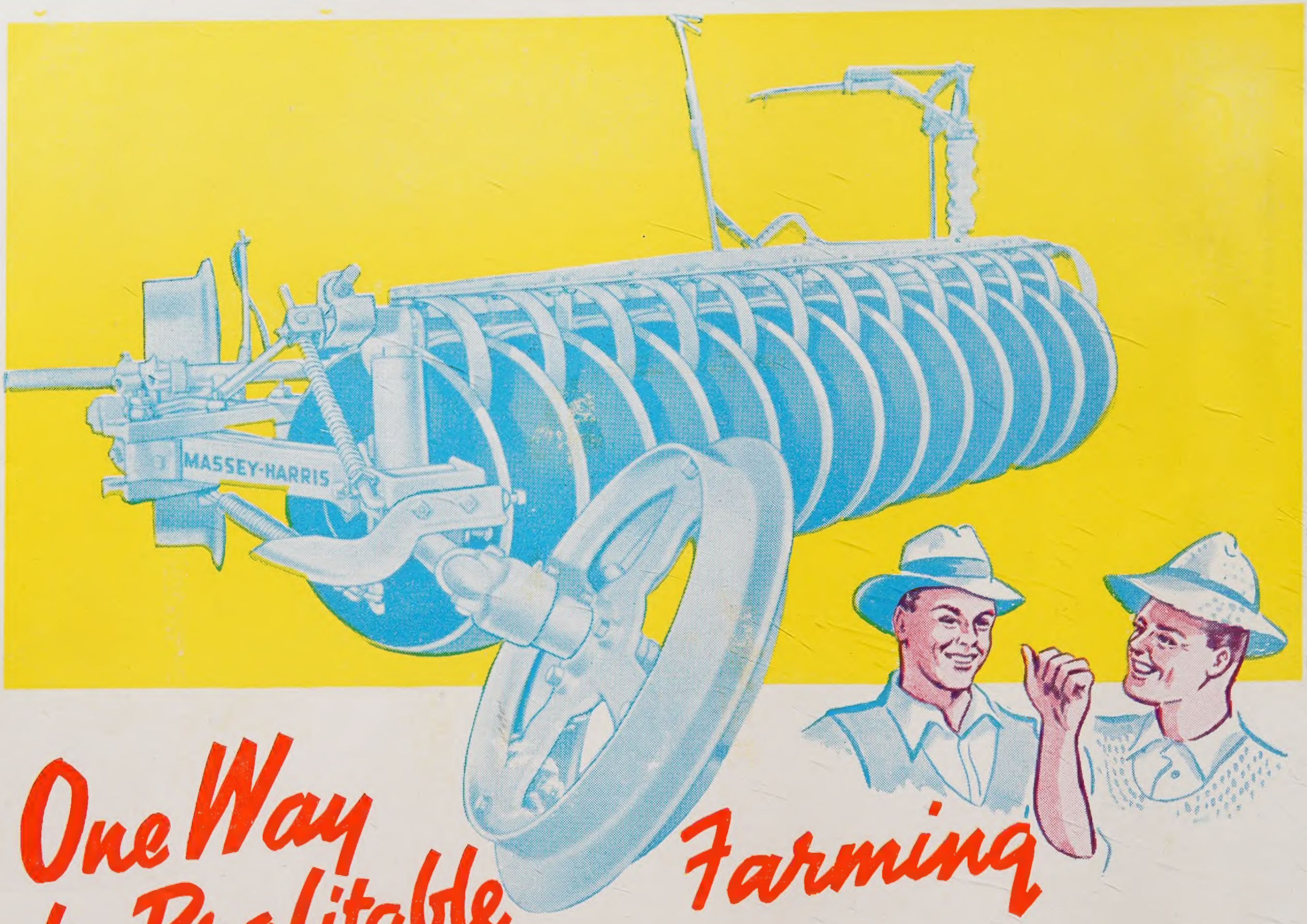

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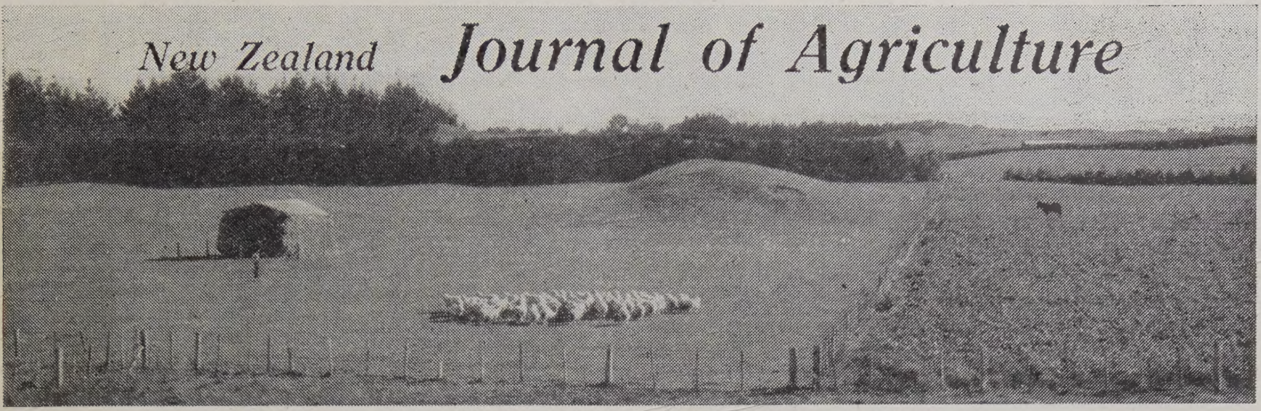

New Zealand Journal of Agriculture

Vol. 72, No. 4. Published by Direction of Hon. B. Roberts, Minister of Agriculture. April 15, 1946.

PRIMARY PRODUCTION COUNCILS

Driving Force of Agricultural War Effort

THE Dominion's war effort from an agricultural point of view is one of which every farmer and individual associated with primary production might well be proud, writes J. M. Smith, Director of the Fields Division, Wellington. The production figures of those six years, representing the war effort of the farmers, stand out as one of the finest war achievements of this Dominion, and in its field comparable with that of the 2nd N.Z.E.F., the R.N.Z.A.F., and the R.N.Z.N.

HOW was this battle on the agricultural front so successfully waged? It can be explained by two short phrases—"untiring effort" and "close co-operation," and in these the work of the National Council of Primary Production, the Primary Production Councils, and their committees stands out in bold relief. This organisation, operating in every part of the Dominion, co-ordinated the efforts of all primary producers and was instrumental in ironing out many of the farmers' difficulties. It was also responsible for a strong liaison between the many Government Departments whose wartime activities closely affected farmers, and the farmers themselves.

Supply and Manpower Problems

The extreme difficulties under which this increased production was achieved must be considered in appreciating this production effort. Practically everything in the way of plant and material associated with farming was in short supply. The constant call for men and still more men to keep the three fighting services up to strength meant a shortage of manpower on farms. Fertiliser was in short supply, and following the loss of Nauru and Ocean Islands the farmers' quota came down to 28 per cent. of that used in the immediate pre-war years. Fencing material, apart from posts, was practically unprocurable, and even posts and timber for maintenance of farm buildings were in short supply because of the general manpower position. Farm machinery, and particularly tractors, was in short supply, and to add to the difficulties spare parts for the rapidly-wearing existing farm machinery were unprocurable and factories that could have manufactured some of these spares had full-time Army orders to execute. Petrol was rationed, and worn-out tyres could be replaced only with the greatest difficulty. The loss of our source of raw rubbers caused an acute shortage of those essential farm requirements such as gumboots and rubber inflations and tubes for milking plants. Baling wire for baling hay disappeared almost entirely for a while, and supplies of such commonplace items as sacks and seaming twine fluctuated, with shortages predominant.

Representative Organisation

It was very obvious early in the war that one of the main roles this Dominion would be called on to play in the war effort would be in connection with food production, and realising this and the probable difficult conditions under which primary producers would have to work, the authorities gave early consideration to the setting up of an organisation representative of all phases of farming. Thus in 1940, at the instigation of the then Minister of Agriculture (the Hon. W. Lee Martin), meetings of representatives of various primary producing interests, labour interests, and the various Government Departments associated with farming were called and the organisation known as Primary Production Councils came into being.

A National Council of Primary Production had headquarters in Wellington, District Councils of Primary Production were formed in the main farming districts throughout the Dominion, and Primary Production Committees functioned in the various areas covered by the District Councils. There were 37 District Councils and 272 Primary Production Committees, the latter having a total of over 1,000 members.

The Minister of Agriculture was Chairman of the National Council, with the Director-General of the Department of Agriculture as Deputy Chairman. Other members of the council were representatives of the Royal Agricultural Society, Farmers' Union, Sheep Owners' Federation, Young Farmers' Clubs, Federation of Labour, dairying and grazing interests, while there were two representatives of North Island District Councils and two of South Island

District Councils. In attendance at all meetings in an advisory capacity were officers of the Department of Agriculture, the National Service Department, and the State Advances Corporation, while from time to time officers of other State Departments were called in when special matters were discussed.

The composition of the District Councils was much the same as the National Council, with additional representatives from Pig Councils, commercial gardeners, orchardists, and agricultural and pastoral associations, where special types of farming were common to the district. In addition, local members of Parliament were ex-officio members of District Councils, and many attended and took a lively interest in the affairs of the councils.

Local Committees of Primary Production were set up by District Councils and usually consisted of 3 to 5 men in each farming district of the council's area.

Without detracting in any way from the work of the National Council or the District Councils, it was the numerous small committees scattered throughout the Dominion which "carried the heat and burden of the day" and to which the thanks of the many are due for a job well and truly done.

Main Activities

The work of the various councils and committees cannot be fully detailed, but some of the main activities are set out as instances of the ramifications of the organisation. One of the principal activities was in connection with the drive for production. Each season production targets for the Dominion were set, and it was left to the local organisation to put the necessary drive into the scheme. The production figures quoted later show how successful the committees were in this respect, and while often the results were short of those aimed at, this was no fault of those who spent much time and trouble organising the effort. Practically everything was in short supply, and this meant that frequently a big job of organisation was called for to enable the limited labour and equipment to be used to full advantage. However, seldom did the committee fail to get full co-operation from the majority of the farmers. Right in the middle of the production season a call would sometimes come for a change in the production plan—extra cheese would be called for in place of some of the butter, and before the complete change had been made the call would be back to butter; potatoes in increasing quantities would be called for at short notice; additional vegetables for the armed services would be required. Yet despite these heartbreaking conditions the committees carried on.

One of the biggest problems facing the primary producers was lack of labour, and councils and committees were given the delicate task of keeping a balance between manpower for the farm and for the armed services within the general manpower policy of the Government. This unenviable task was carried out faithfully and well and the various committees, fully alive to the heavy responsibility they were carrying, gave recommendations to the authorities without fear or favour. So much faith had certain Appeal Boards in these committees that their recommendations in connection with appeals were seldom questioned.

In dealing with labour on farms during the war, it would not be out of place to pay a tribute to the work of the rural womenfolk. Day in and day out, winter and summer, wet or fine, these women toiled alongside their husbands or sons, and at times in the absence of menfolk altogether, keeping production going. To them much of the credit of our wartime primary production is due.

Fertiliser rationing was also a major activity of councils. While the main ration was merely a matter of simple mathematics, there were literally thousands of appeals on the basis of hardship or other grounds provided for under the regulations, and every case had to be investigated on its merits and a decision made as to what was a fair and just allocation of fertiliser.

Practically all farm machinery was brought under control and releases made only under recommendation by councils. Particularly in regard to tractors was this a difficult and thankless job, for councils were frequently faced with the task of having to recommend from 40 or 50 genuine applications one or two of the most necessitous so that the tractors so released could do the greatest good for the largest possible number in the field of primary production.

Councils were also in close touch with petrol and tyre rationing, the controller of these commodities making releases on the recommendations of councils, while other farm requisites such as gumboots, cement, etc., during times of acute shortages were similarly released. Other activities are those in connection with rural housing, harvest labour, rehabilitation of returned servicemen, and special farm reports.

Production Details

The following figures are eloquent of what was achieved during the difficult war years.

	Average of five Seasons 1934-1939.	Average of five Seasons 1939-1944.
	Tons.	Tons.
(1) Butterfat ..	189,900 (5)	191,500 (5)
(2) Meat ..	470,000 (6)	526,000
(3) Wool ..	134,000	148,000
	Acres.	Acres.
(4) Area under chief cash crops ..	348,700	406,500

(1) Year ended July 31. (2) Year ended September 30. (3) Year ended July 30. (4) Wheat, oats, barley, maize, peas, and beans for threshing, potatoes and onions outside boroughs. (5) Owing to change in allowance of butterfat represented in milk and cream consumed, the total butterfat figures given are higher than those quoted in previous years. (6) Three seasons only; years ended June 30.

The above table adapted from the annual report of the Director-General of the Department of Agriculture, 1945.

AREA UNDER CEREAL AND PULSE CROPS FOR THRESHING‡

	Average of five Seasons 1934-1939. (Acres).	Average of five Seasons 1939-1944. (Acres).
Wheat	214,200	255,900
Oats	63,400	57,700
Barley	22,400	30,000
Maize	6,900	8,100
Peas and beans	19,100	33,200
	326,000	384,900

‡"Wartime Farming," P. W. Smallfield. N.Z. Journal of Agriculture, December, 1945.

Services Appreciated

The councils were at the zenith of their activities when the war finished. As the organisation was purely a wartime one, the activities of councils and committees have been brought to a close. The members who for practically six years have given their services freely and without monetary reward can rest assured that these services have been fully appreciated. All State Departments who have been associated with councils and committees have been loud in their praise of the assistance they have at all times received; controllers of various commodities, in their thankless task of making that little go as far as possible, have expressed their earnest appreciation of the help at all times given by councils.

The Department of Agriculture, the Department of State most closely associated with the organisation, records its sincere appreciation of the assistance rendered the Dominion by the many hundreds of members who, through their work and co-operation, have been instrumental in creating wartime production figures of primary products of which all may be justly proud.

Poa Aquatica: Its Uses And Its Dangers

By C. WALKER, *Instructor in Agriculture, Thames.*

IN certain circumstances some plants are valuable; in others they may be harmful. This is well illustrated by a plant, the botanical name of which is *Glyceria aquatica.* This plant until a few years ago was called *Poa aquatica,* and it is by the latter name that it is probably better known. Both the value of *Poa aquatica* as a fodder plant and its danger as a plant that will block streams—in relation to its present distribution in the Thames Valley basin—are discussed in this article.

AT present there is quite a sharp divergence of opinion in the Thames Valley basin on the question of whether *Poa aquatica* has a place in New Zealand's farming economy or whether it is a distinct menace to farm lands.

This controversy has been provoked by the fact that the grass, since its establishment in the district, has spread at an alarming rate into waterways, and has seriously invested drains, canals, and even rivers. The effect upon the waterways is marked, particularly in checking the flow of water, in causing much silting up, and in completely eliminating waterways in some places by growing right across them. County councils' officials, drainage boards' authorities, and farmers in the vicinity have been viewing the position with considerable alarm; they have been agitating for drastic action to be taken in an effort to combat the grass.

Viewed from this angle, the spread of the grass is serious; some action is necessary to ensure that waterways are kept open. The grass is so vigorous in its rate of growth that in a few years a small colony will develop into an area of several acres.

Moreover, with its ability to re-establish from sections that break off and float about, the grass can spread very rapidly along waterways. In tidally-affected canals long lines of this material are commonly seen moving up and down the streams according to the flow of the water. In due course these pieces become anchored to form new colonies, or they may be carried by floods across country to establish on wet peat land.

Value for Grazing

Despite adverse criticism of the grass because of the trouble caused in waterways *Poa aquatica* is generally conceded to be of value for stock grazing. This is borne out by the fact that one farmer devotes nearly 100 acres of his 320-acre farm to this grass.

The land in question is partly-drained shallow peat which was first sown in the grass about 15 years ago. The area then was poorly drained and largely covered by rushes; there were large clumps of blackberry on the better-drained parts. In the intervening period *Poa aquatica* spread over the whole 100 acres, developed a very dense sward, eliminated blackberry and rushes almost entirely, and today is fattening bullocks. The farmer who is handling this area claims that he can carry an average of a grown beast per acre throughout the year, and for much of this time he is compelled to double this rate of stocking in order to hold the growth.

LATE DELIVERY OF "JOURNALS"

THE Department apologises to subscribers who complain of late delivery of their "Journals." Many printing difficulties have to be contended with during the present shortages of staff and machinery, and the steady rise in circulation is an additional complication, both in the printing and dispatch of the "Journal." Until the wartime lag in machinery and staffs is caught up it will continue to be difficult to ensure prompt delivery of the "Journal" to all subscribers, and we can only hope that readers will bear with us in our efforts to produce, under these circumstances, a "Journal" which is "better late than never."

His system of drainage is to provide shallow depression channels rather than conventional drains. These simply provide for collection of storm water which they convey to main waterways. At the same time they do not lower the water-table sufficiently to enable English grasses and clovers to flourish, although in parts he had an appreciable amount of *Lotus major* showing. An examination of this farmer's stock supported his claim that they do well on the grass; and, in these circumstances, it must be concluded that the grass here is serving a useful purpose.

Spread of the Grass

The problem, however, is not the establishment of *Poa aquatica* on areas where it is likely to be suitable. Rather, it is a matter of controlling it and of preventing it from spreading to waterways that serve other highly-productive lands.

The grass is a menace only because it tends to block streams. It is not regarded as likely to harm other pasture lands by actual invasion, as it will not tolerate good drainage conditions for long.

The spread of *Poa aquatica* occurs in one or more of the following ways:

1. By stock grazing the edges of drains and streams, and breaking off pieces which float away to establish elsewhere;
2. By drain cleaners failing to remove all pieces of *Poa aquatica* from the streams while they are at work;

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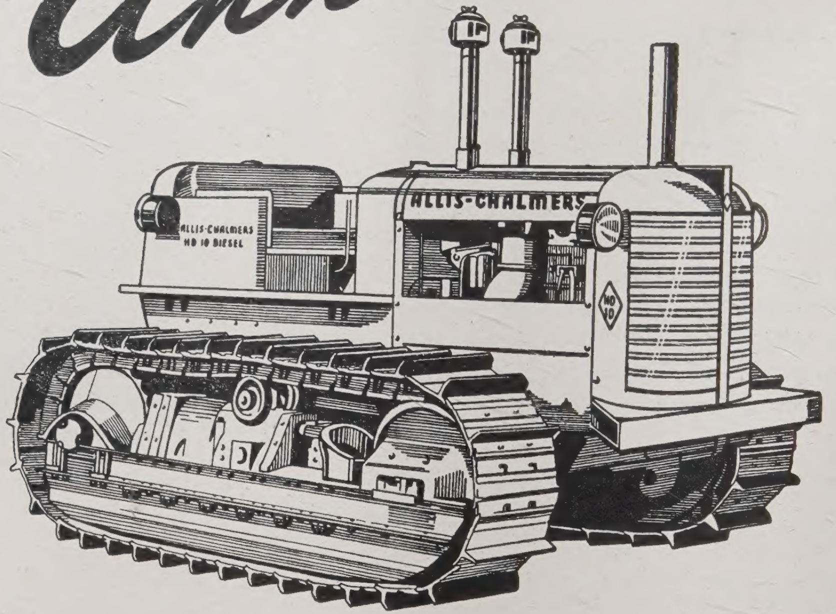

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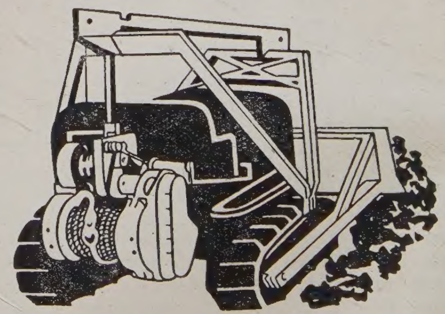

3. By large rafts of material which break off from parent colonies floating away and anchoring elsewhere;
4. By floods carrying pieces across country; and
5. By wild fowl (probably duck) carrying seed from place to place.

Where possible, control should be exercised, as, for instance, by keeping stock from affected drains, or by advising drain cleaners to put all material on banks.

Apart from this, however, the major problem of keeping large waterways open and fairly free from the grass requires the attention of drainage engineers working through some competent authority. Dredges would be necessary, and, in such work, care should be exercised to ensure that no grass escapes to establish other colonies. The bulk of the grass should be placed on high land where it will die. Fortunately most of the rivers and canals are provided with stop banks upon which the *Poa aquatica* could be placed as it is dredged from the streams.

Other Means of Control

Apart from the controls already advocated, the planting of drains and canal banks with trees so that the banks are well shaded has the effect of greatly reducing grass establishment. Farmers and drainage boards, therefore, could assist greatly in control of *Poa aquatica* by planting their waterways with trees to reduce the growth of the grass.

Owing to the huge bulk of water in streams recourse to poison sprays would not be very effective. Sprays would be quickly diluted to a strength which would be quite innocuous. However, in tidally-affected streams *Poa aquatica* fails to establish or thrive where the water is saline. Consequently no acute problem exists in the lower reaches of drains, streams, and rivers where salt water is encountered, although the grass menaces much of the drainage system of these areas, and fairly strong control measures are required.

It is not anticipated that any measures will be completely successful for eradicating the grass, but maintenance of waterways by dredging would minimise i's present adverse effect upon land drainage.

While the grass has certain virtues on poorly-drained land where it will establish freely and carry a quantity of stock equalled only by first-class pastures on more favoured country, the main consideration should be that of the greatest good for the largest number; and, if this point is conceded, then *Poa aquatica* will require rigid control to prevent it from becoming a menace to other farm lands.

POA AQUATICA ON WATERWAYS

Poa aquatica on drain sides.

Looking down a waterway completely filled with *Poa aquatica*.

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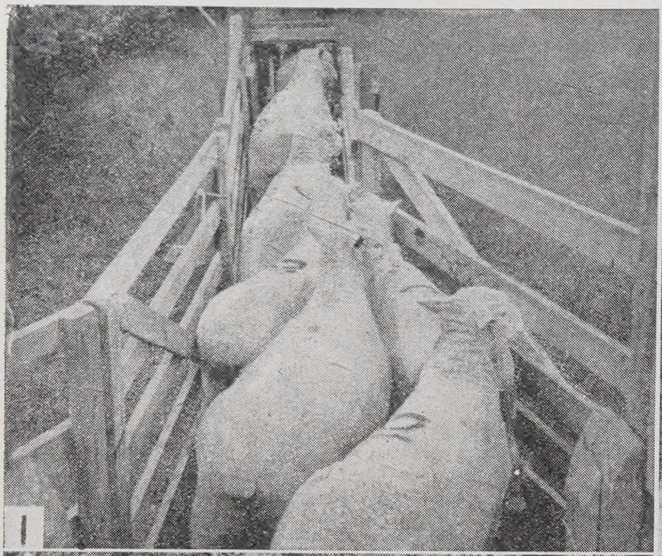
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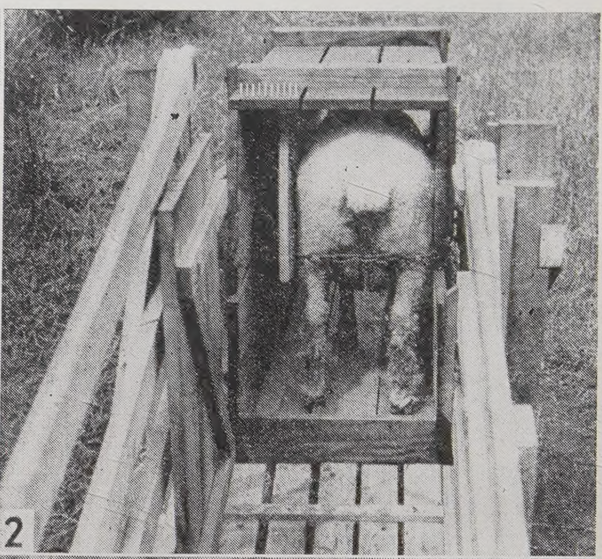
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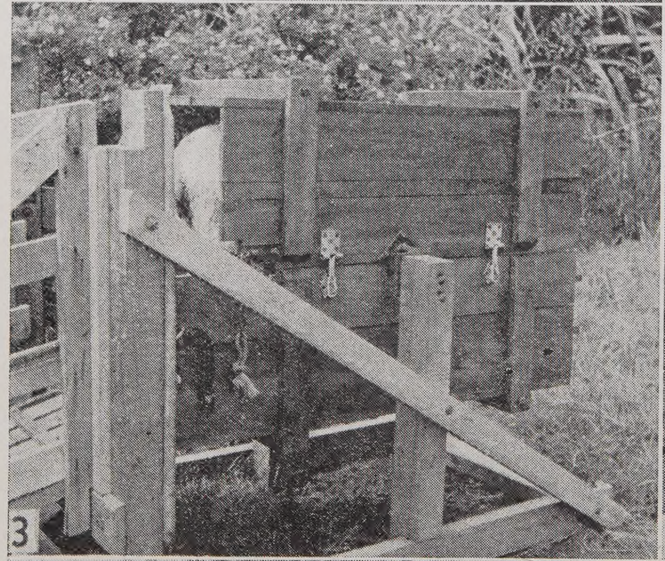
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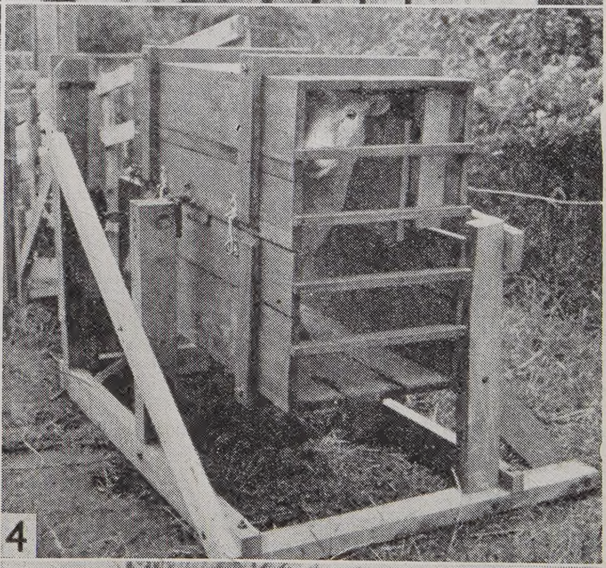
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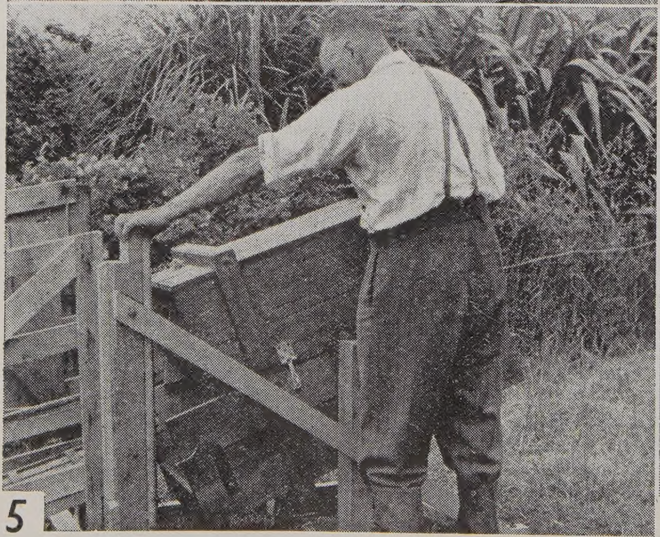
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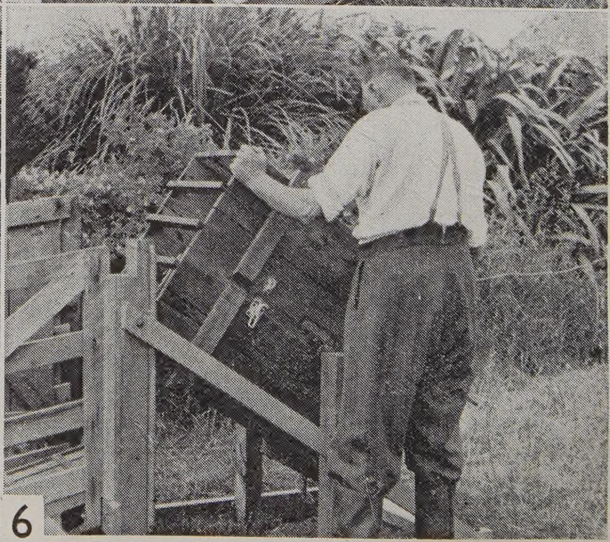
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TRIMMING SHEEP'S FEET

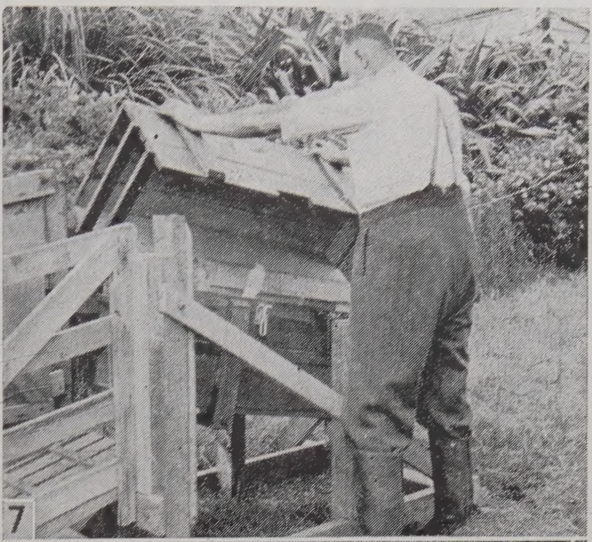
By J. E. DUNCAN, *Wool Supervisor, Wellington.*

MR. E. J. Kelly, a sheep farmer of the Waverley district, has recently invented and developed an interesting new type of sheep-handling cradle which eliminates most of the hard manual labour usually associated with foot-rotting. The pictures on this and the opposite page tell the story at a glance, but it should be mentioned that this demonstration model was set up in an open paddock, whereas normally it is incorporated in the drafting race or a special short race in the yards, or can even be set up in the woolshed.

AS will be seen from Fig. 2, the box is adjustable for any size of sheep, as the hinged board has a chain attached, by which it can be pulled across to hold the sheep firmly against one side of the box. This chain also prevents the sheep from backing out. The next picture (Fig. 3) shows how the box is built in two halves—hinged together at the far side and fastened at the near side by the hasps shown in the picture. The box is suspended from the outer framework by two pivots so that it can be turned over—end for end—as a complete unit. It will be noticed from Fig. 4 that the front of the box is closed only by narrow wooden slats, so that in its normal position in the yards a sheep entering can see ahead to the pen beyond, and the sheep in this pen act as a decoy.

The next three pictures (Figs. 5, 6, and 7) show the box being tipped over—half a turn—so that it finishes upside down, with the sheep lying on its back. Tipping the box actually requires very little effort, as it is well balanced and swings over very easily. As the turn is completed the hasps fall open and the upper half of the box can be opened back and rests on the frame as shown in Fig. 8. When the sheep finds itself trussed up in this position it can do very little about it—and usually doesn't try. The sheep are not knocked about at all, and in fact they receive considerably less rough handling than they often get when caught, upended, and held in the usual way for foot-rotting. The feet are now at just the right height, so that trimming can be done without stooping. Another advantage is that wet sheep can be put through with equal facility and the operator himself doesn't get wet in handling them—while the hoof is softer and easier to trim in the wet condition than when bone dry and hard. The last picture shows the sheep being released—simply a matter of undoing the chain and tipping the sheep forward on to its feet. The box is then closed and swung over into position ready for use again.

Another useful feature, not obvious at first glance, is that sheep can readily be crutched while held in the box. Mr. Kelly has rigged up a single-stand electric shearing plant hung from a tall post right alongside the appropriate end of the box, and while he is trimming the sheep's feet his assistant can be doing the crutching. Neither man gets in the way of the other, and they can both do their jobs with a maximum of convenience and a minimum of labour. Both units—box and cradle—are portable, and can readily be moved to different positions when required.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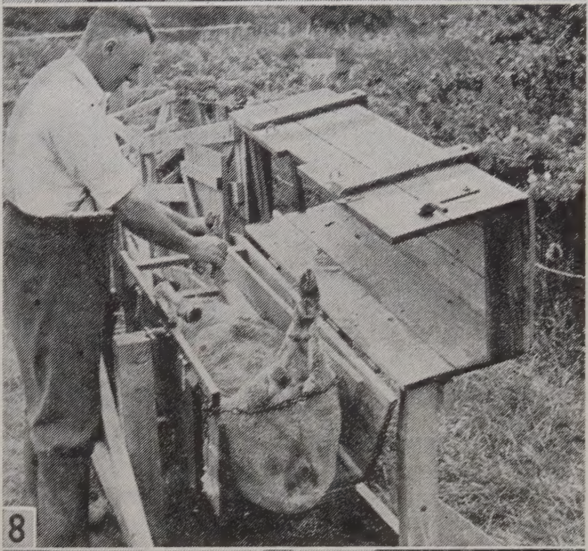
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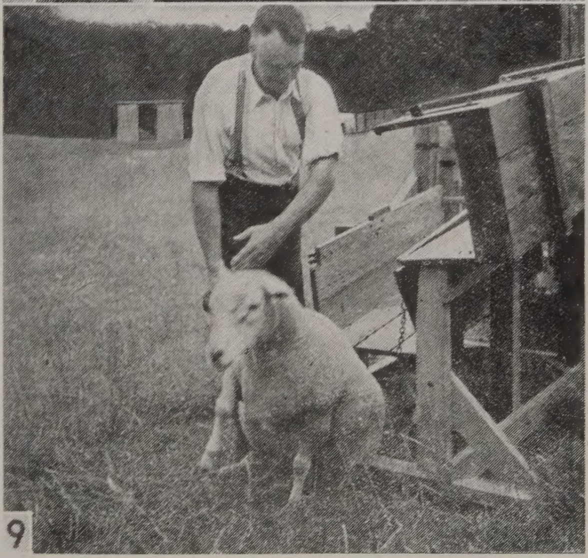
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Fig. 1—Sheep entering box from crush pen. Fig. 2—Sheep in position with chain fastened. Fig. 3—Side view of box before tipping. Fig. 4—Front view. Sheep can see ahead. Fig. 5—Starting to tip box over. Fig. 6—Upside down—tipping almost complete. Fig. 7—Opening half of box back out of way. Fig. 8—Sheep securely held; feet being trimmed. Fig. 9—The job finished, sheep is easily released.

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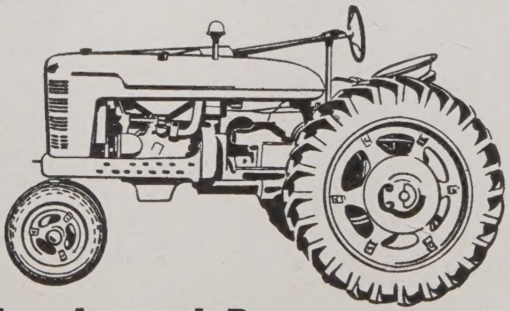

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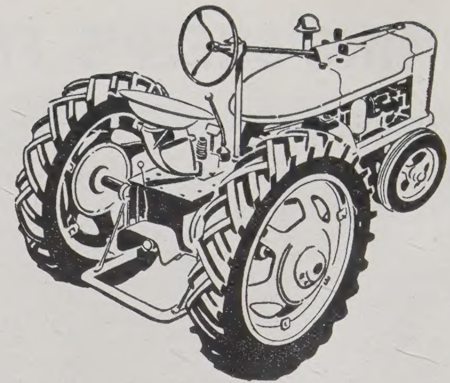
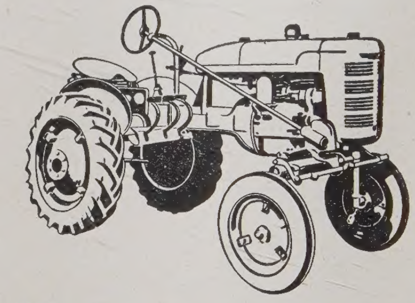


The H. The three-furrow job with four working and a 15 m.p.h. speed. It has replaceable cylinder sleeves, variable governor control, and a host of other important features.



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FARM SHELTER

Planting on Sea Coasts To Combat Heavy Winds

IN this second of a series of articles on farm shelter by T. E. Rodda, Fields Instructor, Hamilton, particular attention is given to the planting of belts on exposed sea coasts in New Zealand. Maintenance and fencing in relation to shelter belts are also dealt with, and basic rules for planting are enumerated.

AS farm shelter belts should be sited and set so as to protect the greatest possible area from the worst prevailing winds they should be planted as nearly as possible directly across the paths the winds traverse. Here, single-row planting is not satisfactory. Four or more rows of trees of varieties suitable for soil and climate are recommended.

An efficient belt may be grown as follows:—

Starting on the windward side plant two rows of *Cupressus macrocarpa* with well-rooted two-year-old plants spaced 6ft. apart each way. Then plant two rows of *Pinus radiata* 6ft. apart each way, and one row of *Cupressus Lawsoniana* or *Cupressus Benthamii* (according to soil) set 4ft. apart in the row and not less than 15ft. away from the *Pinus radiata*.

On land not suitable for *Lawsoniana* or *Benthamii*, African boxthorn should be planted if the land is dry and well drained. If soil tends to be heavy, *Hakea saligna* should be planted. The inner single row (no matter what plant is selected) should be kept topped and trimmed on the sides, and should be cultivated and manured to encourage quick and solid growth before *Pinus radiata* roots invade the ground in numbers sufficient to retard growth. This single row of closely-grown shelter will eventually become a ground wind-arrester.

Ground Draughts

Even with the best management pines and macrocarpas will open up at the bottom and let cold draughts through. Another way to stop ground draughts is to plant (on suitable soil) a row of African boxthorn on the windward side of the macrocarpas. The boxthorn, if planted 12ft. from the macrocarpas, will grow fairly quickly and will keep pace with the macrocarpas until the side branches of the macrocarpas almost reach the boxthorn. After the second year the boxthorn may be topped and lightly trimmed on the windward side. The lee side should not be touched, but the side growth should be allowed to reach out and meet the advancing macrocarpa branches.

The *Pinus radiata*, being the quickest growing, soon reach a fair height and should be topped before reaching 20ft. The *Cupressus macrocarpa* should be topped at 15ft. with the side branches coming to windward lightly cut back before they reach the row of boxthorn.

Another method is to plant a hedge of *eleagnus* on the windward side 8ft. from the first row of macrocarpas. The *eleagnus* should be trimmed on the windward side but not on the lee side, and the tops should not be cut. As the macrocarpa branches advance, the trailing growths of the *eleagnus*, which become intermixed, grow upwards and eventually form a solid wind barrier from 15ft. to 20ft. high and sometimes more.

ON EXPOSED SEA COASTS.

The establishment of shelter on exposed sea coasts is often difficult. As salt-laden winds are extremely severe on the foliage of many of the most useful trees, only by careful selection and use of resistant species can success be achieved. The difficulty on many exposed coast lines is to find a hedge plant sufficiently hardy to

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get started. Once a frontal screen is started, even though of low stature, protection will be provided for other trees.

For this pioneer work, farmers and others may have to depend on native trees such as veronicas, griselineas, pittosporums, flax, and cabbage trees. The pohutukawa, while quite suitable on some of the coasts of the Auckland Province, is not reliable for the colder climates further south.

The width of the belt to afford efficient protection for large areas of farming country will be governed by the slope of the land. If the country is flat, or has a gentle slope towards the sea, 33ft. to 50ft. will be sufficient, but if the slope is more than 1 in 20, a slightly greater width will be necessary.

Raising Suitable Trees

Trees for seaside planting should be robust and well-rooted but not too tall. A height of 8in. to 10in. is sufficiently tall for planting out in permanent situations. Plants should be raised in an exposed nursery with climate similar to the locality in which they are to be planted; not in a nursery that is too well sheltered. A temporary breakwind, which will have to be erected for protection during early growth in the nursery, will have to be removed 7 to 8 months before the plants are lifted from the nursery rows.

The veronicas and griselineas may be readily raised from cuttings and the cabbage trees and pittosporums from seeds. Flax plants may be obtained by cutting out fans from an established bed of naturally-grown flax and rooting for at least a year in a nursery.

How to Plant on Sea Coasts

The two methods of planting which may be adopted are described in the following paragraphs. (The first which is more costly may not appeal to the average run-holder. However, it will effect establishment in a shorter period).

Method 1:—Erect a manuka shelter 2ft. 6in. high on the seaward side. This may be effected by erecting posts 12ft. or more apart and stapling one plain wire on the landward side of the posts 1ft. 6in. above the ground. Dig a trench 6in. deep and the width of the posts underneath this wire. On the seaward side of the posts strain another plain wire the same height as the first, but leave it unstapled for the time being. Insert manuka scrub, keeping the lower ends on the bottom of the trench. Pack tightly to the thickness of the posts about 4in. between the wires, stapling the seaward wire as the space between each two posts is completed. Fill in the trench and trample tight. Provided the soil is not loose and sandy and is of good solid loam, prepare a strip of land 23ft. wide from this breakwind by ploughing and working down wherever the plough can operate. If, however, the land is loose and sandy do not cultivate, but dig pits large enough to accommodate the roots of the plants without crowding or bunching. At 2ft. 6in. from the breakwind, plant one row of broadleaf (*Griselinia littoralis*) 2ft. 6in. apart, and one row of *veronica elleptica* 2ft. 6in. from the broadleaf and the same distance apart. Then plant two rows of flax (*Phormium tenax*) with 3ft. between the rows and 3ft. between the plants. Behind the flax, plant one row of *Pittosporum Ralphii* or *Pittosporum Crassifolium*, and then plant a row of cabbage trees 4ft. apart each way.

Two years after planting the native trees the width of the belt may be increased and improved by planting two rows of *Pinus muricata*. The rows should be 8ft. apart, and the first row of pines 8ft. from the cabbage trees. Allow 8ft. between the pine trees. In a few years this belt will assume a sloping top a few feet high fronting the sea to 15ft. or more on the inner side. The manuka breakwind may be allowed to remain for two or three years where it was erected. If it cramps the spread of the griselineas, causing them to grow tall rather than bushy, remove it. Best time for removal is in November when the danger from heavy blasts of salt winds has usually passed. The exposed frontal screen of shrubs will then have sufficient time to harden up before winter gales set in again.

Method 2:—No temporary protection is afforded by building a manuka breakwind. The order of planting is practically the same except that a frontal screen—two rows of broadleaf and two rows of veronica—is planted. Frequent inspections must be made to ensure that none of the little trees commences to rock and become loose at the base. Any which have moved must be trampled firm again. Staking may be necessary in many cases.

METHODS FOR PLANTING SHELTER BELTS.

On moderately heavy soils preparation for planting should be made by ploughing where possible and working down to a fine tilth during late summer or early autumn. Places for the trees should be marked out, small pits opened up with the spade, and the earth left to aerate for a few weeks.

Sandy soils in windy situations should not be cultivated. The soil should be disturbed as little as possible.

***Eleagnus* planted on windward side of a row of macrocarpas interplanted with poplars make an impenetrable wind barrier.**

On Rough Land

On rough land covered in scrub, where it is not possible to plough, the following procedure is recommended:

Slash down all tall-growing manuka, gorse, and blackberries, but leave any very short growth of scrub and fern. Erect pole lines 6ft. apart, and along these lines at distances of 6ft., with a light mattock, skim the rubbish off an area 18in. to 20in. in diameter, and loosen-up the soil by driving in the mattock as deeply as possible. Leave these areas for a few weeks to sweeten before planting.

When planting in open pits the bottom of each pit should be firmed, the tree placed in the centre, and the roots spread out evenly. Care should be taken that the roots are not bent up or cramped. The fine soil which should be scattered among the roots should be trampled in firmly, but care must be exercised not to injure the roots. On loose, sandy soils trample the soil firmly right to the surface, but on heavy clay soils leave a shallow layer of the top surface loose to conserve moisture and prevent cracking during dry weather. On a small scale it pays to place a forkful of well-rotted farmyard manure in each pit. If artificial manure is used —blood and bone, or blood and bone and superphosphate in equal parts—two handfuls a tree is recommended. Artificial manures should be well mixed with soil that is being returned to the pits.

May is a good month to plant in the warmer districts; August is probably more suitable for the colder areas.

Trees should not be planted out into wet or temporarily waterlogged soils. Here, planting should be delayed until the soil is in better condition, even though operations may be postponed until late in the season.

Occasionally, tall and spindly trees come from the nursery. These are inclined to rock and sway with the wind, and funnel-shaped holes are formed round the stems at ground level which become filled with water after rain. Spindly trees should be well pruned back or securely staked to ensure that they will strike successfully.

Maintenance and Fencing

To encourage quick growth it is desirable to cultivate trees planted on the worked areas. This may be done

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with a horse cultivator, giving three or four strokes with the implement during the spring and summer months of the year. Usually after the second year from planting the trees are too close for the passage of horse implements. Cultivation should then cease. The belts planted in scrub and on sandy soils should also receive attention during the first three years. The area (the top of the original pit around each little tree) should be kept clean of grass or rubbish, and the surface slightly loosened with a hoe. Tall-growing scrub and blackberries should be slashed down. Belts planted in sandy areas should receive attention. Suppress scrub, blackberries, and gorse, but do not cultivate or hoe.

All shelter belts and plantations should be well fenced to prevent stock injuring the trees. In districts where hares and rabbits are troublesome the use of wire netting to exclude these vermin is wise. Fencing for shelters is costly, but other means for protecting trees in their young stages are not known. Even after trees are established cattle should not stray among them. Allowed free range, cattle destroy all lower branches of the outer rows and the object—dense growth at the base—is defeated. Generally, fences should be erected at least 9ft. from the tree rows to afford ample protection as the trees grow. Later, if stock reach through and over the wires and cause injury, it may be advisable to shift the fence further infield or to place an electric fence on the field side of the existing wire fence.

Tall-growing trees like *Pinus radiata* and macrocarpa are improved by topping when they reach a height of 25ft. They should be cut back to 20ft. The new top growth should be shortened back occasionally.

Two-row shelter: *Cryptomeria elegans* in the front and *Cryptomeria japonica* at back planted 4ft. apart on clay country.

Sheer neglect. Trees were correctly planted and well protected during their early life, but the fence has not been shifted out or kept in repair. On the other side of this single-row shelter conditions are the same and in 2 years the trunks will be entirely stripped of foliage for 4ft. or more; such single-row shelter becomes useless as a ground wind arrester; in fact a greater volume of wind is drawn through the openings.

Rules for Planting

To attain best results the following rules should be observed:—

1. Trim off all broken and injured roots;

2. Plant a tree no deeper than it was planted in the nursery;

3. Place the tree in the centre of the pit to allow even development of roots. In very exposed places the plant should be placed against the solid earth on the side of the pit opposite to the prevailing wind with the roots well spread out to windward;

4. Plant trees in an upright position with tap root going straight down and with lateral roots spread out, not bunched together or bent. After the roots have been lightly covered with fine soil give the tree a gentle lift upwards. This has the effect of distributing the soil evenly among the root fibres. Trample firmly right up to the surface in light soils. With heavy clay soils leave the surface loose;

5. Do not allow roots to become in any way dry—probably the most frequent cause of failure. Trees for planting should be wrapped in a damp sack or carried around in a shallow box covered with a damp sack; and

6. Do not put grassy sods into the hole. These may cause air spaces and drying of roots.

(To be continued).

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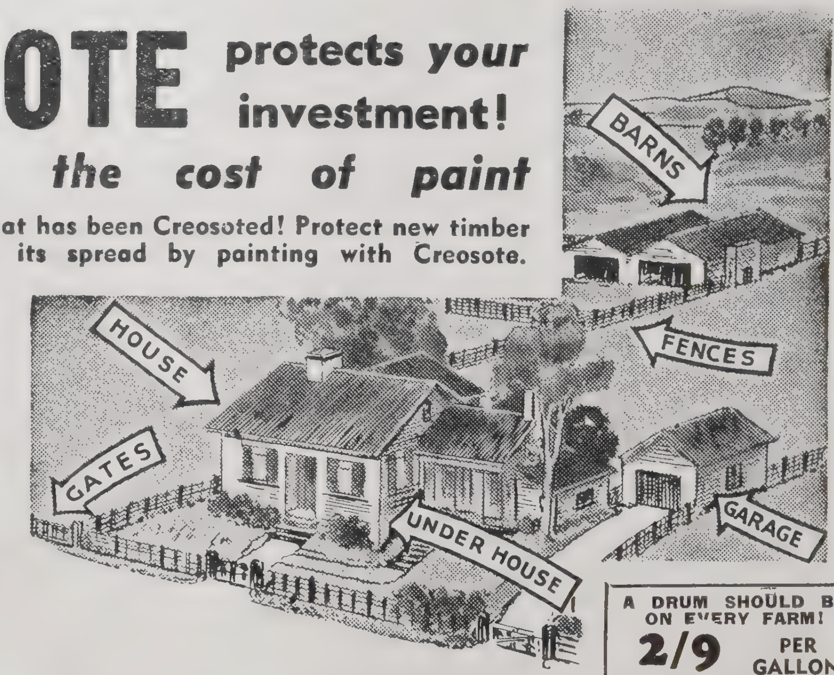

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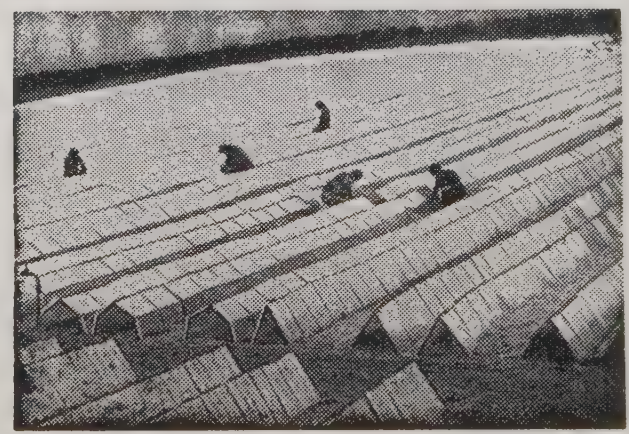

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PREPARE BEE COLONIES NOW FOR WINTER

By E. SMELLIE, *Apiary Instructor, Christchurch.*

THE success of next season's honey crop will depend largely on the condition of each colony in the late autumn. Careful preparation of all colonies for the winter months is important. As bees in the autumn are usually in the mood to rob, beekeepers, when opening hives, should take care to prevent the development of this trouble in the apiary.

ROBBING, which is very easily started, is difficult to control. Consequently, prevention is better than cure. When care is taken to avoid opening hives unnecessarily and also to prevent bees from gaining access to honey in the honey house, or to any exposed honey adjacent to their hives, robbing activities will be reduced to a minimum. If a hive must be opened it is essential to perform any required manipulations as quickly as possible, and where bees are observed alighting on any exposed combs, the open hive should be closed immediately, and the entrance to all hives in the apiary contracted with a suitable block to prevent the trouble spreading.

Where a hive is being robbed by other bees, a number of them will be found fighting at the entrance while others are flying around awaiting an opportunity to gain admission.

That robbing is in progress is also indicated when bees are noticed climbing well up the front of a hive to get a good "take-off" with their load of stolen honey. Bees belonging to the hive under normal conditions fly straight off from the lighting board.

Removal of Supers

Autumn work which should not be neglected is the removal of all surplus supers. By removing all empty supers, the space in each hive is restricted. This allows the bees to keep warm during the winter. It is advisable to reduce the hives to two full-depth boxes. It may not be found possible, however, to confine strong colonies to their winter quarters immediately without causing congestion. Where supers full of wet combs have been placed back on the hives at the close of the season, a good plan to induce the bees to remove all honey from these combs is to place them over a mat, which has a small hole cut in it to allow the bees access. The bees, on finding that these combs are separated by the mat from the main cluster, usually lose little time in transferring the honey below.

Where queen excluders are used, these should be removed from the hives at this time and placed in the honey house until they can be cleansed of burr comb and propolis in readiness for next season.

Good Worker Combs

Combs which contain large patches of drone cells are detrimental to the welfare of a colony in the spring, when brood rearing begins. Beekeepers should therefore make certain that the brood-chambers contain good combs of worker cells before closing the hives down for the winter. Inferior combs which contain either honey or a little brood may be placed above a mat on the hive as previously described, and when empty, may be removed and placed under cover for rendering down later on.

Ample Stores

Losses from starvation or from shortage of stores can be very costly to the beekeeper. The provision of ample honey to meet each colony's winter needs must not be overlooked. The amount of honey required to maintain bees between the autumn and the gathering of spring nectar varies according to locality, but it is generally considered that at least 40lb. of honey is necessary to winter a colony successfully and to provide sufficient early food for brood rearing in the spring. The best policy is to leave an excess of honey on the colonies rather than take any risk. By calculating on the basis that a full comb contains 6lb. of honey, it is easy to estimate the weight of honey in the hive. Where the amount of stores in a hive is less than 40lb. the deficiency can be made up by the insertion of the required number of combs.

Some beekeepers attempt to judge the amount of honey stores in a hive by lifting it at one end to test the total weight.

This method cannot be recommended; at best it is only guessing, and beekeepers are invariably deceived by the weight of brood and pollen present in the combs. The only satisfactory way to assess the amount of stores is to make an examination of each hive.

Uniting

Colonies found to be queenless, or weak in bees (not sufficient to cover at least five combs) should be united to other colonies in the apiary to ensure that all hives enter winter in good condition. To attempt to save queenless or weak colonies as separate units at this time of the year would probably result in their total loss. A simple way of uniting two colonies is by the use of newspaper. Where two colonies to be united each contain a queen, the queen of lesser value should first be removed or killed and a hive containing a laying queen, brood, and stores, should then be

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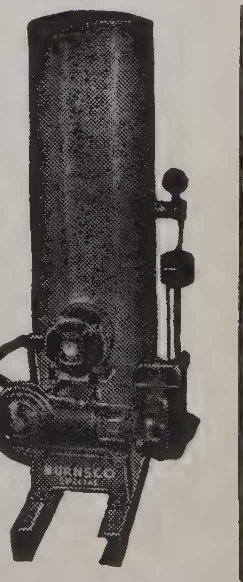

gently lifted off the bottom board and placed on top over a sheet of newspaper. There should be no exit from the top hive until the bees have eaten their way through the paper to the colony below when they will usually amalgamate and settle down without fighting.

Foul Brood

No colony should be allowed to go into the winter when it is infected with American foul brood (*Bacillus larvae*). Every effort should be made to winter disease-free colonies. To attempt to "treat" foul brood at this time is futile. There is always a danger of the healthy colonies becoming contaminated through the robbing of infected hives. The safest and cheapest policy is to destroy all diseased bees and equipment by fire immediately.

Dampness

If bees are kept warm and dry during the winter, they will be greatly assisted to remain strong and healthy until the spring. Sound hive equipment is necessary to achieve this condition, and beekeepers should make sure that the hives, particularly the roofs, are in good condition and leak-proof. Good clean sacking will make a satisfactory hive mat when cut so that the edges do not overlap the supers or protrude from under the roof and so absorb rain moisture.

A free circulation of air beneath the bottom boards also assists in keeping the hive free from dampness and associated troubles. In apiaries where the bottom boards rest on the ground and have no air space, it is an advantage to raise them and support them on bricks or short lengths of stout timber.

April is usually the last month in the season in which the weather allows the beekeeper to open hives with safety; beekeepers who have not prepared their colonies for the winter should now do so.

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AUTUMN CLEAN UP IN THE ORCHARD

CLEANING up of orchards in the autumn involves the assembling of equipment and the clearing of the packing shed. Orchards should be ploughed, drainage and shelter belts attended to, and sprays, where necessary, applied, writes A. R. Grainger, Orchard Instructor, Christchurch.

TREE props, picking boxes, ladders, the orchard wagon, and other implements should be collected and stored under shed cover. Ladders will be needed again soon, but before being used for pruning they should be repaired and repainted. When cleaning the packing shed, attention should be given to the grader and the floors, and to the collection and storing of all packing materials, cases, packing stands, rubber stamps, and other small equipment.

Requires Careful Thought

In ploughing the orchard the best practice is to plough "on" to the trees a light furrow and finish the land in the middle with an open trench. If the land is not flat, the direction in which to plough requires careful thought. As erosion must be avoided as far as possible ploughing across the slope is recommended if the fall of the land is appreciable. If the fall is slight and drainage is essential, ploughing up and down the slope is desirable. If the main and subsidiary drains of the orchard become blocked by vegetation and debris during the summer, subsequent flood waters may overflow on to the surface, make new paths to the lower levels, and cause large patches of top soil to be washed from around the orchard trees.

It is important, therefore, that drains be cleaned out before the winter rains set in so that the water may take the course provided for it.

Shelter belts must receive attention periodically. Where these are extensive, topping all of them may not be possible in one year; each season, as opportunity occurs, they should be treated. The happy medium of excluding as much wind as is compatible with the admittance of as great an amount of sunshine as possible should be aimed at. The protection of orchard trees from the competition of extending roots of shelter trees such as pines or poplars must not be neglected. Good deep cultivation of the headland will do much towards keeping the roots of shelter trees from spreading into the orchard; it is good practice to dig a trench along and about 3ft. from the trunks of shelter trees every two or three years. The depth of this trench should range from 12 to 24in. according to the nature of the soil. This trench need not be left open; the object is to cut lateral roots of the shelter trees. If this work is done at reasonably short intervals the latter do not grow unduly. Replacements or additions to shelter should be considered now as the planting season is near at hand.

Late Sprays

Generally, the application of a late-autumn spray to fruit trees is unnecessary, but as a "clean up" in certain instances it is worthwhile.

Stone fruit trees which have been heavily attacked with fungous disease such as leaf curl or die back should have an application of Bordeaux mixture at strength of 5-4-50 when the leaves are falling freely. Apple and pear trees on which black spot or pear scab has been prevalent should have the same application at a similar stage of foliage.

It should be emphasised, however, that these sprays are additional to and not a substitute for the spring applications which are the most important sprays for the control of fungous diseases.

New Plantings

Deciduous trees are usually planted in June and July, but the ground should have been prepared in advance. In May there is an opportunity for ploughing, discing, and harrowing. Contact should be made with the nurseryman from whom trees have been ordered and final arrangements made with him for delivery.

Harvesting and Storing

In most orchard districts work for May is varied. The harvesting and storing of late varieties of apples, preparation for new plantings or replacements, and pruning will require attention.

The principal varieties of apples which may still remain to be harvested are Ballarat, Statesman, Grannie Smith, Tasma, Sturmer, Dougherty, Rokewood, and Yates. Ripe spot (*nea fabraea malicorticis*), is a disease which thrives in mature tissue. Therefore, apples should be harvested without delay when mature. Grannie Smith, Sturmer, and Tasma are the apples most desirable for cool storage while the other varieties mentioned are often orchard stored, particularly in southern districts. Where fruit is to be held in ordinary storage particular care should be taken to see that it is protected from rats and birds, rain and dust.

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Wintering of Hoggets and Calves

By E. H. ARNOLD, *Instructor in Agriculture, Whangarei.*

THE wintering of hoggets and calves is primarily a question of winter feeding. The shortage of winter feed which regrettably occurs season after season will be much more acutely experienced this year. Growing immature animals will react far more adversely to inadequate and unsuitable foods than will adult animals. As a result of malnutrition during their first winter, hoggets and calves are readily susceptible to serious and most likely permanent setbacks. Young stock become stunted in size, and experience has shown that this also results in the stunting of their life's production, whether it be butterfat or wool and fat lambs.

POOR growth caused by poor feeding intensifies the harm done by internal parasites. The turning out of young stock on to rough scrub and fern country, the grazing of rain-washed, stemmy pasture, and the feeding of poor-quality hay are all practices not consistent with good wintering.

Even with the acute shortage of feed expected this winter, the stock owner must strike a balance between the needs of his cows or ewes on the one hand, and his heifers or hoggets on the other, so that the younger animals, his future production machines, receive the best feed available.

Feed such as leafy grass, good-quality grass and clover hay, roots, and green crops, all of which are relatively rich in digestible supplies of body-building materials, is required. The provision of a lick comprising boneflour and salt is beneficial.

Rolling country well provided with shelter is good land on which to winter hoggets and calves; they do poorly on wet flat land. Adequate well-planned shelter belts and hedges protect young stock from the winter's cold biting winds, and enable more of the feed available to be utilised for growth rather than simply to maintain body warmth.

No Check from Weaning

Hoggets should receive no check from weaning as lambs until the following spring. On those farms where winter crops, such as turnips, are not required on account of the mildness of the winter, hoggets can be successfully wintered on pastures. Following weaning on to paddocks of clean short feed (the aftermath of a hay crop is very suitable), preferably on topdressed areas, they then require shifting every 10 days or two weeks, grazing always ahead of the ewes, on to fresh short feed. Cattle are required to clean up any rank growth ahead of the hoggets. Thus the hoggets receive the best feed available and do not graze pasture likely to be contaminated with internal parasites spread from older sheep. Poorly-wintered hoggets, short of feed, running with or following the ewes, are most likely to be seriously affected by lung and stomach worms. When hoggets come into the winter in good condition, protected by preventive drenching, and provided with suitable and adequate feed, there will be minimum winter losses. During routine shepherding any poor "doers" can be removed into small paddocks of short topdressed pasture.

Root crops are best fed off in breaks, with an adjacent run-off provided.

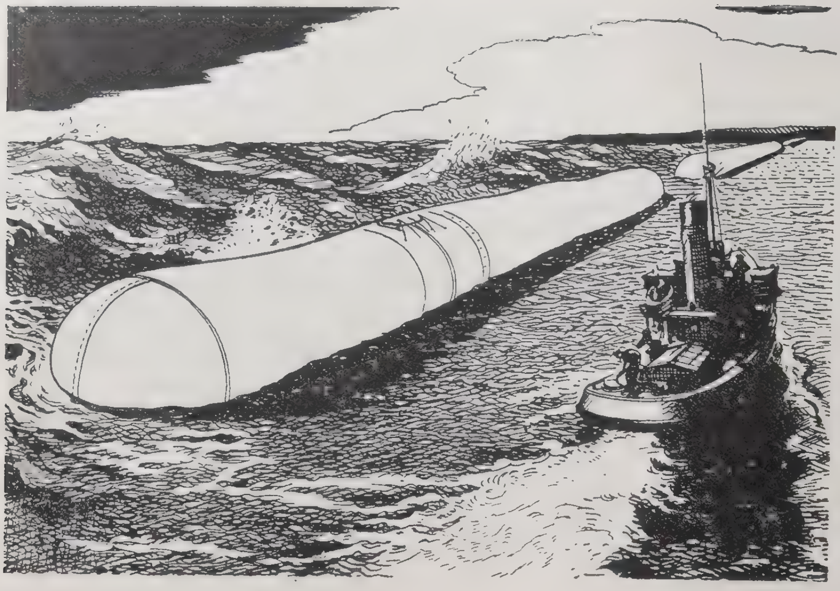
In those districts, particularly in the south, where such crops as turnips are the mainstay of winter feeding, grazing of the crops should commence early so that hoggets do not lose condition and are in a fit state to derive any benefit from such feeding. Crops are best fed off in breaks, with an adjacent run-off provided. Allowing the hoggets on for an hour or two for the first two or three days will minimise digestive upsets caused by a change from pasture. After they have eaten the best of the feed, they can be changed over to a fresh break and the crops cleaned up with the ewes.

When winter pasture growth and crops are short, and also when such crops as green oats or red clover are fed exclusively, some hand feeding will be found beneficial. Even good pasture hay, up to 10lb. per head per week, depending upon other feed available, will be economical. Oaten sheaf chaff fed along with other feeds such as bran, oats (either whole or crushed), peas, linseed cake or meal, and wheat is useful. The grains or meals can be fed at the rate of half a pound per head per day. Small quantities of meat-meal or pea-meal will make up the protein deficiencies in the diet of sheep grazed on turnips alone. All dry feeds are improved in feeding value, especially in palatability, and the binding or impaction effects overcome by the addition of a molasses solution.

Like hoggets, calves should never receive a check from weaning until the following spring. On some farms vigorous, healthy calves after weaning go back in condition with the onset of the colder months, and often die. Losses of up to 50 per cent. have been recorded. Well-bred, valuable young animals are too often "put aside" on to rough feed at the back of the farm. Deaths are often attributed to internal parasites, but even when drenching is carried out losses still result. On farms where feeding and management are good losses from parasites seldom, if ever, occur.

Grazed Ahead of Cows

Following weaning from skim-milk and supplements, calves should be rotationally grazed round the farm ahead of the cows. If the autumn is dry, and silage or turnips are being fed to the milkers, calves allowed in for a few hours before the cows will confine themselves mostly to the leaves and the pick of the silage.



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* Post-war disclosures of D-day secrets

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About early May, before the autumn growth goes off, before other stock require supplementary feeding, and before the calves lose condition begin to feed good hay, which can be put aside during the haymaking season in a convenient position. The hay should be fed out even if it is a week or so before the calves consume any quantity. So that the calves can obtain the pickings of pasture available, continue to graze them rotationally round the farm ahead of the cows, and increase the amount of hay, feeding as much as can be consumed each day. Small, low, specially-constructed hay-racks are invaluable. As calves would have only the left-over feed to eat, they should not be run with the older cows.

From mid-June until August the provision of 1 to 1½lb. of crushed oats or linseed cake each day for a calf will make all the difference between good and bad wintering. As the pasture growth comes away in the spring hay feeding should be continued until any danger of scouring among the less well-done calves is past.

◆

Answer to Correspondent

Cow With Skin Complaint

"L.C.W.," Otaki:—

Last summer my purebred Jersey house cow had a skin complaint in a mild form. When the cooler weather arrived the rash disappeared, but it has returned in a much worse form this summer. The rash appears in a small lump and then turns to a watery sore. The cow licks the affected parts. This licking tends to enlarge the sore. Could you kindly help me with my problem.

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The rash from which your cow suffered is a form of urticaria or nettle rash, and occurs in animals in the warm weather on rich feed.

The disease is usually sudden in its onset and takes some time to dry up, the skin oozing with a little blood or serum in severe cases, such as with your cow. You are advised to give the following drench directly you notice the first symptoms, should they recur:—

Epsom salts (magnesium sulphate): 12oz.

Potassium nitrate: 2oz.

Divide into six powders and give one twice daily, dissolved in a pint of water.

◆

Common causes of footrot and precautionary measures necessary are treated in Bulletin No. 172, "Footrot in Sheep," which is available free from offices of the Department of Agriculture.

DON'T LET THIS HAPPEN

HOW TO DEFEAT WOOD-BORERS

By J. H. SMITH *and* A. C. FORBES,
State Forest Service, Wellington.

THE habits of the principal wood-boring insects in New Zealand, and methods for combating their attacks, are dealt with in the following article. The treating materials recommended are only those that are readily available to householders and usable without much risk. Simple methods for their application are detailed, together with information that will help in identifying the various insects.

IT is important to note that there is no short-cut to success in exterminating wood-borers. Although the treatments recommended are easily applied, they call for painstaking care, and to be effective they must be persevered with over a period of years. Constant watchfulness is also necessary to prevent new attacks and reinfestations. Firewood, fencing timber, boxes, and furniture are all possible sources of infection. Every piece of wood brought into a building or its vicinity should be examined with care, and control measures applied if required.

The principal wood-boring insects causing damage in buildings and interior woodwork are:—

(a) The common house borer (*Anobium domesticum Linn.*).
(b) The powder-post beetles (*Lyctus* spp.).
(c) The native two-toothed longhorn (*Ambeodontus tristis* Fabr.).
(d) The native termite (*Calotermes brouni* Frogg.) and introduced Australian species.

Distinguishing Marks

The workings of the first three insects are distinguished by the size and shape of the flight holes made by the adult beetle emerging from the wood after undergoing the usual life cycle—grub and pupa—and by the frass left in the borings.

Termite attack may be distinguished by the presence of small, hard, round pellets of digested wood. In addition, the introduced Australian termites always maintain contact with the ground moisture by means of covered earthen runways, but the native termites inhabit and attack wood without requiring any direct ground moisture.

The house-borers and powder-post beetles make holes from 1/32 to 1/16in. diameter, while the two-toothed longhorn makes a large, oval exit-hole measuring from 1/5 to 1/2in. along the major axis. The frass from the borings of the house borer is quite loose and feels coarse and gritty, as compared with the densely-packed, fine, flour-like powder left by the powder-post beetle.

The workings of the two-toothed longhorn are distinguished by faint markings round the walls of the tunnels made by the larvae gnawing their way through the wood, while the tunnels are packed with undigested wood dust.

The common house borers and powder-post beetles largely confine their attack to sapwood, the former principally in softwoods, e.g., rimu, and the latter exclusively in hardwoods, e.g., tawa. Both sapwood and heartwood are attacked by two-toothed longhorn and termites, the longhorn favouring softwoods, while termites attack both softwoods and hardwoods.

Life Cycles

The life of the common house borer varies from one to three years. Eggs are laid in old flight holes, as well as in cracks, crevices and joints, but never on perfectly smooth surfaces. As the grub grows, it bores in every direction in the wood. When it reaches maturity it bores towards the surface of the wood and forms a small enlarged chamber in which it pupates. This chamber may be less than 1/32in. below the surface of the wood. The

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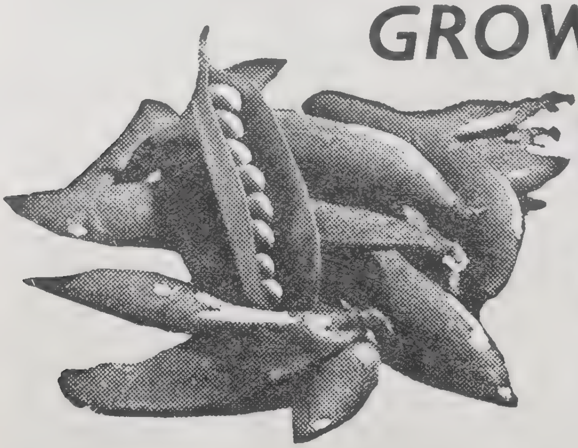

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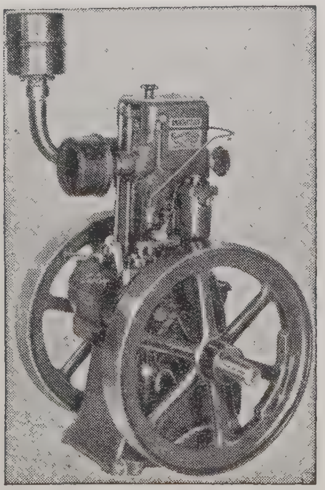

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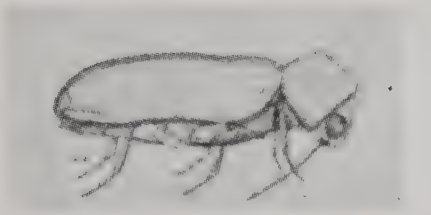


The adult hardwood powder-post borer (magnified).

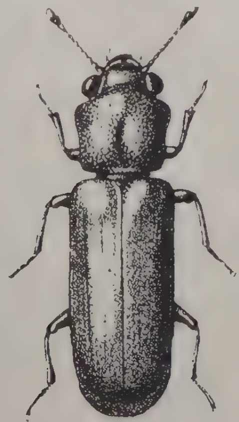
perfect beetle emerges generally between December and March in Wellington, but somewhat earlier in the north and later in the south.

The adult beetles vary from 1/10 to ¼in. in length. They are boat-shaped in form and red-brown to dark-brown in colour. The head is withdrawn beneath a hood. These beetles are reported to be most active at dusk and during the night, although attracted in daylight to those portions of the building receiving direct sunlight. Generally, they tend to inhabit old flight holes by day and to lay large numbers of eggs in them.

Powder-post Beetles

The powder-post beetles commonly have a life cycle of one year, and lay their long, cylindrical eggs in the cavities of exposed hardwood pores, never in cracks or crevices or on smooth surfaces. The eggs hatch out in a few weeks, the grubs boring immediately into the timber and tending to follow the grain much more consistently than the house borer. The frass produced is fine and tightly packed, as compared with the gritty and loosely-packed frass of the house borer.

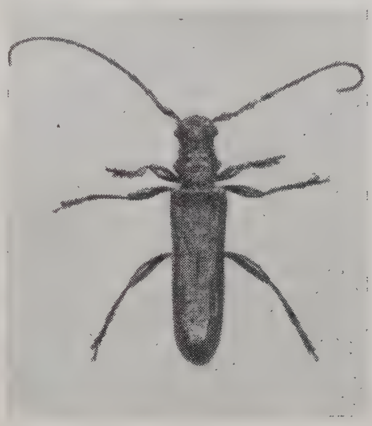
The pupal chamber is constructed close to the surface of the wood, and the beetles emerge at about the same time as the common house borer. Although somewhat shorter than the house borer—from 1/10 to 1/7in. in length—they are more elongated and flattened, and are brown to black in colour. All species of *Lyctus* beetles are distinguished from *Anobium domesticum* by the fact that the head is visible from above, projecting beyond the thorax and hood. Unlike the common house borers, they seldom fly during the day, shunning the light and collecting on the dark under-surface of infested timber.



The adult common house borer (magnified).

Two-toothed Longhorn

The two-toothed longhorn has a life cycle of at least three years, if not considerably more, and deposits its eggs in cracks, crevices, and joints under slight projections or on the surface of roughly-sawn wood. The larvae, which are whitish in colour with a blackish head, bore along the grain and pack their tunnels with undigested wood dust. Well-developed specimens attain a length of 1in. They make faint markings running round the walls of the tunnels while gnawing their way through the wood. In emerging from their pupal chambers, the beetles leave characteristically oval-shaped holes, with a major axis of from 1/5 to 1/3in. Their maximum emergence months throughout the country are April, May, and June. They are from ½in. to 1in. in length, narrow-bodied, and chocolate to reddish-brown in colour, and are characterised by a pyramidal spine on each side of the fore thorax, while on the upper surface a pair of knot-like swellings project. The beetles shun bright light, and prefer to emerge on the concealed surface of the wood, such as the under-side of floors, where the flight holes ordinarily go unnoticed.



Adult beetle of two-toothed longhorn.

Termites

Termites, often erroneously called "white ants," form colonies, which are divided into castes. Winged adults form the reproductive caste, and are present in the colony during spring, summer, or autumn. Workers are the most numerous members. Blind, white in colour, and soft-bodied with inconspicuous jaws, they are usually the smallest of the forms, but nevertheless perform the major work. They gather food, feed the royal pair, soldiers, and young, build mounds, tunnels, or nests, and generally act as scavengers.

The soldiers are wingless, sterile, and generally blind, and have elongated heads with conspicuously large jaws.

The food of termites generally consists of cellulose, but they may eat leather, bone, leaves, grass, or sugar. They do not form mounds, but construct irregular, and at times extensive, burrows in timber, a characteristic feature of these workings being the large number of faecal pellets which are deposited.

There are two New Zealand species, *Calotermes brouni* and *Stolotermes ruficeps,* belonging to the dry-wood group. They are mainly found in the forest, but *C. brouni* is found infesting houses. Three species of the "earth dwelling" termites from Australia are now established in New Zealand, and in a few localities do considerable damage to houses, being especially active in floor joists, flooring, weather-boarding, and studs. These three species are *Coptotermes acinaciformis, C. lacteus* and *C. Frenchii,* and of these the former is the most wide-spread in its distribution.

Detection of Borer

The first action against borer attack is a thorough survey of every piece of timber on a property—firewood, boxes, furniture, and the buildings. All timber showing flight holes should be regarded with suspicion and subjected to the minutest scrutiny. Are insects still working in it or not? That is the practical question. In the interior of buildings and in furniture signs of active attack are readily per-

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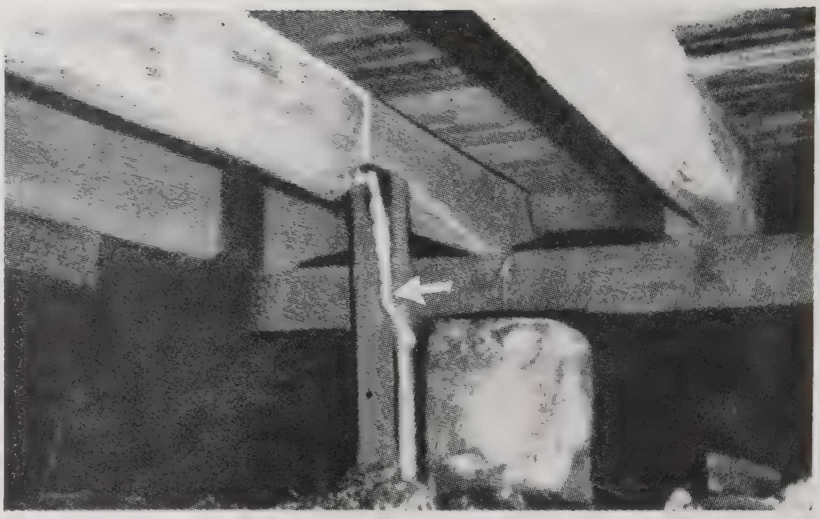
ceptible in the new appearance of the last year's flight holes, the insides of which appear quite fresh and light coloured. In exterior timbers these weather rapidly, and additional evidence must often be looked for. Any discharge of powdered wood from exit holes should be regarded as prima facie evidence of attack, and the timber earmarked for treatment. This discharge may take place at practically any time of the year owing to newly-created frass being forced out through old exit holes, but it is most noticeable at the time the insects are approaching the surface to form their pupal chambers, so inspections should always be made at the appropriate periods of the year.



Foundations of a recently-built house being attacked by subterranean termites. Note the termite runways.

Even where no exit holes have yet appeared, a discharge of frass may take place at joints or cracks in the timber as the larvae pass these points in their borings. With powder-post borers, a minute discharge is possible also through the pores of the hardwoods infested. Literally, every piece of timber which can be examined in a building should be carefully inspected. Both sub-floor and roof timbers should be inspected wherever possible, the former in particular, for signs of attack by the two-toothed longhorn.

Further Inspections

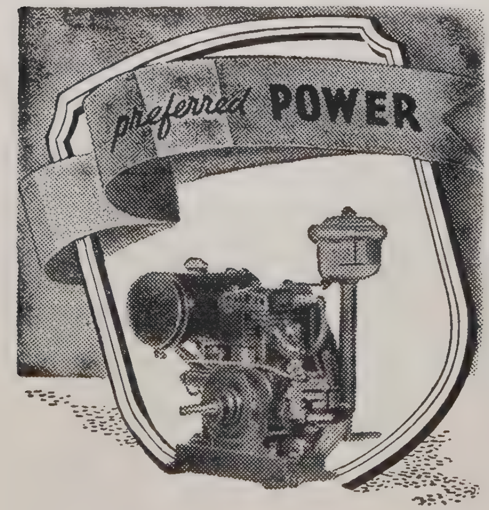
It is not sufficient, however, to make only one such inspection, treat the affected woodwork, and imagine that the problem is solved. Two inspections should be made regularly each year in the early spring and the late summer and autumn, and the appropriate measures applied on each occasion. Furthermore, each piece of wood brought on to the property at any time, whether in the form of firewood, boxes, timber, or furniture, should be carefully inspected, and, where necessary, treated.

Failure to observe these precautions may result ultimately in attack or re-infestation. The importance of making regular inspections with newly-erected buildings cannot be overstressed, as the early detection of attack will facilitate treatment and simplify subsequent preventive measures.

It must not be thought that, because the timber has been sterilised by kiln-drying, it is immune from further attack. This is not so. It may be attacked like ordinary air-dried timber.

Needless to say, the greatest care should be exercised in the erection of new buildings, and the employment of an architect who will carefully examine all timber is invariably to be recommended. Where the timber has only just become infested, however, and no flight holes are visible, the attack is extremely difficult to detect, and experience indicates that a few boards of infested material sometimes go into new buildings. It is, therefore, particularly important for the first few years to make very careful inspections, and as soon as any flight holes or other evidence of attack become apparent to apply a suitable treatment immediately, preferably the same day, to confine the attack to the boards originally infested. Particularly in the early stages of infestation, the adult common house borer beetles tend to inhabit their exit holes during the day and to lay the greater number of their eggs in them, so that the early detection of flight holes is of major importance.

Observation for new flight holes should begin about October in the north and December in the south, and continue at appropriate times. Where old flight holes are present, earlier signs of activity will be apparent from frass forced out of these by larvae working in the vicinity.



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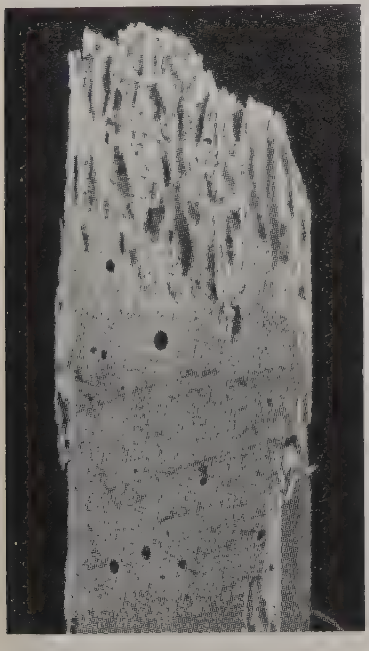
Treating Materials

There are numerous preservatives possessing some merit for treating timber to resist borer attack, but many of them (such as arsenic compounds) are highly poisonous, and dangerous not only to the person applying them but also to subsequent users of the timber or occupants of dwellings. For this reason the materials recommended in this article have been limited to those which are relatively safe to use and yet effective against wood destroyers.

The protective effect is achieved by making the wood poisonous or repellent to the organisms that would otherwise attack it. The chemical substances used for this purpose should be poisonous to the wood-destroying organisms, permanent, highly penetrative in wood, safe to handle and use, and also inexpensive. For the treatment of building timbers and furniture they may also require to be clean, colourless, odourless, paintable, or non-swelling.

For either exterior or interior use where its smell is not objectionable, and may even be advantageous, as on many farm outbuildings, creosote is undoubtedly the most effective material. It may also be used for treating sub-floor timbers of dwellings, where its smell should not be too objectionable, but greater discretion is required in its use for roof timbers, since the heat generated under galvanised iron may be sufficient to make the smell objectionable.



Flooring-board attacked by larvae of the two-toothed longhorn. Note typical oval-shaped exit holes and damaged interior of board.

Portion of white pine board showing the sap (right) damaged by the common house borer and the heartwood (left) so far undamaged.

When purchasing creosote, it should be specified that it comply with the requirements of British Standard Specification, No. 144-1936.

Interior Work

Where a relatively clean treatment is desired, such as for surfaces to be painted, house interiors, and furniture, a toxic chemical dissolved in a cheap organic solvent is recommended. High volatility is a desirable feature of the solvent, since it can then evaporate from the wood in a short time after the treatment. As it evaporates it leaves the toxicant in the wood, which is then in a suitable condition for the application of finishes (paint, stain, or varnish) or for immediate use.

One of the toxic chemicals recommended for this type of preservative is pentachlorphenol. Besides being highly toxic, it has a very low solubility in water, and is, therefore, suitable for outdoor use where a more soluble chemical would, in time, be leached out of the wood by exposure. Suitable solvents for pentachlorphenol are light fuel oils, such as diesel oil or kerosene, but as the solubility of pentachlorphenol in these materials is limited, it is usually necessary to add a small quantity of a substance having a higher solvent power, for which purpose pine oil, benzole, or orthodichlorbenzene is suitable.

A treating solution containing not less than 5 per cent. by weight of pentachlorphenol should be used, made up as follows:—

Pentachlorphenol	**5 parts by weight**
Light diesel oil or kerosene	**94 " " "**
Pine oil	**1 " " "**

Instead of pine oil, benzole or orthodichlorbenzene can be substituted, but it may be found necessary to use up to 3 parts, in which case the proportion of diesel oil or kerosene should be reduced to 92 parts. It should be noted that the solvent power of light fuel oils for pentachlorphenol varies considerably and it may be found possible to dispense with the additional solvent altogether, or in other cases to increase the proportion of it.

Diesel oil is not very volatile. Hence, after treating, some days should elapse before applying paint coats or putty. Kerosene is somewhat quicker-drying, and is more suitable for treating solutions to be used inside dwellings, particularly on surfaces to be covered by wallpaper. Both diesel oil and kerosene, especially the former, have a slight staining effect on wood, but it is usually of no consequence.

In preparing a treating solution, it is recommended that the pentachlorphenol be first soaked for a day or so in a solution containing all the additional solvent (pine oil, benzole, or orthodichlorbenzene) and a small quantity of the diesel oil (or kerosene), the remainder of the latter being added finally. Prolonged stirring will probably be found necessary, and while gentle warming considerably hastens the process of solution, it is not recommended on account of the fire risk.

Water solutions of toxic salts, such as zinc chloride, are recommended only for treating timber before it is put into use, as the swelling and shrinkage of the wood which accompany changes in its moisture content would, in most cases, be objectionable for timber in situ.

Need for Permanence

The need for permanence in a preservative is obvious. No material that evaporates from the wood in a few years, or that changes chemically in a short time into ineffective compounds, is suitable. For instance, paradichlorbenzene, orthodichlorbenzene, and cresylic acid are sufficiently toxic, but too volatile to remain in the wood for any length of time, so that although they will eradicate borer, they will not prevent future attack.

When purchasing a made-up preservative, the consumer should know just what he is buying. It is unwise for him to trust the life of his wood structures to preservatives of unknown composition or to invest his money in materials that may differ widely in quality from time to time without his knowledge. He is very likely to pay exorbitant prices for cheap, ineffective, or inferior materials. Before investing any appreciable amount of money, the consumer should insist upon knowing the precise composition of the preservative he plans to buy. When convenient, it is also wise for him to have analyses made to see that the material furnished complies with the stated formula or specifications.

Methods of Treatment

No matter how good a preservative may be, its effectiveness depends on the thoroughness with which it is applied. The aim is not only to destroy the larvae, thus preventing the emergence of the adult beetles and the extension of their attack to other woodwork, but also to obtain a substantial absorption and deep penetration of the preservative into the timber to render it immune from future attack.

Unfortunately, the most effective treatments involve, among other requirements, complete immersion of the wood in the preservative, but for timber in situ such processes cannot be carried out, so brush, spray, or similar methods must be resorted to. In using such methods, the preservative should be flooded over the surface of the timber and allowed to soak into the wood as much as possible; it should not be brushed out thin, like paint.

Two coats provide much better protection than one, but the second coat should not be applied until the first has dried or soaked into the wood. All cracks, crevices, joints, and other openings should be filled as thoroughly as possible. In particular, care should be taken to force the preservative into the flight holes, and while a hand pressure pump of the nature of a large hypodermic syringe would be useful for this purpose, its use may necessitate considerable patience, and the employment of firms equipped with power-driven compressors and special injector guns may often be justified. If a large capital outlay is involved, the employment of an architect or master builder to superintend the work is recommended.

Reinspections

Although a large measure of success should be attained by the adoption of the foregoing methods, the superficiality of the treatment does not ensure that all larvae have been destroyed or that the wood is immune from further infestation. It has been demonstrated that termites are skilful in utilising any weak points in the protective shell of treated timber, and under laboratory conditions have been observed, in the absence of untreated wood, to attack and penetrate only the thinly-impregnated portion to reach the untreated wood within, leaving the thickly-impregnated portion untouched, when the two are equally available. Although such observations were made with termites, it is a reasonable assumption that other wood-boring insects would show similar discrimination. This shows the need for careful reinspection.

In some buildings the incidence of attack may be so general, and the depredations of the beetles so far advanced, that any treatment is of doubtful value, but in all cases of localised and selective attack the appropriate measures will fully repay the expenditure of considerable time and money.

Removal of Boards

In a new house where the attack is confined to perhaps only one or two boards, their removal is strongly recommended and should be seriously considered if at all practicable.

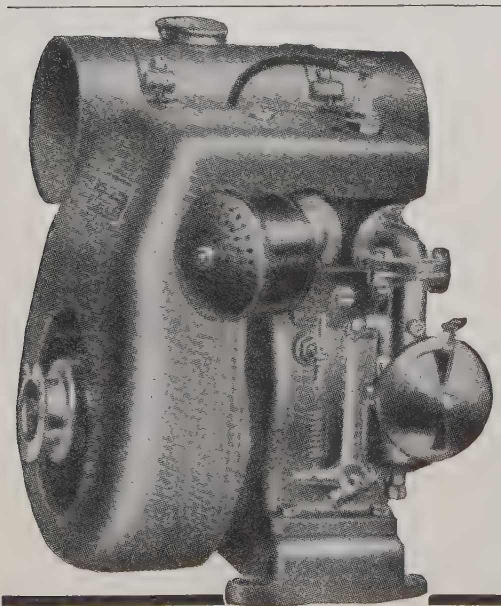
Particular attention should be paid to attacks by the two-toothed longhorn. The depredations of this insect may extend for several feet beyond the last flight holes, and other timbers in contact with the affected boards may also be infested. So destructive are the activities of these insects that exploratory borings or probings should be made in the vicinity to ascertain the full extent of their workings. Heavily-infested flooring should be removed immediately and, if the attack has spread to floor joists, heavy injections of a preservative should be applied.

Where the strength of joists would not be seriously affected, large auger holes may be bored and filled with preservative from time to time as it seeps into the timber. The holes should be placed beyond the region of attack so that a heavy impregnation of the entire cross section will form a barrier to the progress of the boring larvae. It should be remembered that preservatives seep along the grain much more rapidly and easily than across it. Holes should thus be as deep as possible, and located with this in mind. Preferably, timber badly attacked by this insect should be renewed, and the removed timber at once burnt.

Special methods are required to deal with the recently-introduced Australian termites, which at present are restricted in their distribution to Auckland city and suburbs and the borough of New Plymouth. If their presence in a building is suspected, the local authority should be notified immediately.

ABOUT PIGS

With the exception of young pigs (which show a small increase) the numbers of pigs were the same at January 31, 1945, as they were in the previous year. The 601,000 pigs in New Zealand are divided into the following classes: Under one year, 509,000; boars, one year and over, 14,000; sows, one year and over, 78,000.



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STUDIES IN FARM MANAGEMENT

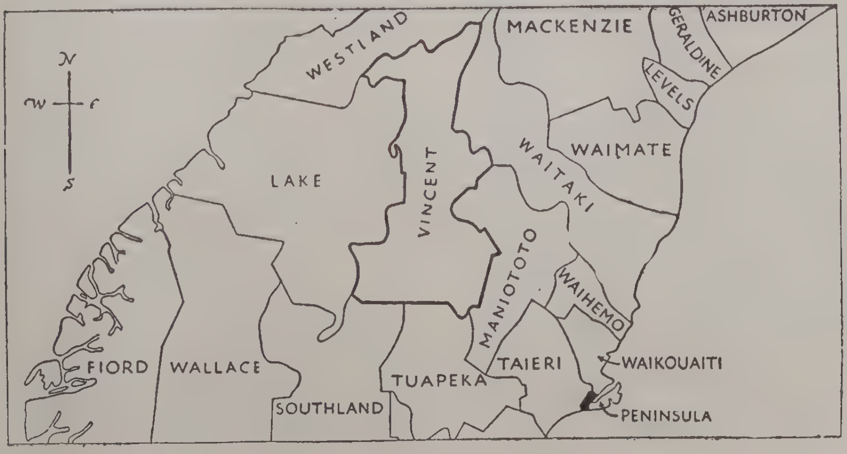
Irrigation in Central Otago

IRRIGATION in New Zealand commenced in Central Otago in the early days of settlement, when it was immediately realised that to obtain reasonable growth under those arid conditions water should be applied to the land. During subsequent development of irrigation much experience has been gained of the best methods of watering pastures and crops under those conditions. As attention is now being paid to irrigation in other districts, particularly in Canterbury, the results described in this farm management study, which are being obtained on two farms in Central Otago, one irrigated by the border dike method and the other by the contour method, will be of topical interest to those contemplating the introduction of irrigation on their farms.

By G. G. CALDER, *Instructor in Agriculture, Ashburton.*

VINCENT County, Central Otago, is composed of high country ranging from 400ft. to mountain chains up to 6,000ft., comprising the sheep-run country separated by valleys on which mixed farming, cropping, and irrigation farming are carried out. The rainfall varies from 12 to 20in. a year, with temperatures ranging from below zero in winter to over 90°F. in summer.

The region offers an extraordinary range of farming conditions—more, perhaps, than any other district of New Zealand. Those desiring wide-open spaces and a mountain range for a sheep station of many thousands of acres will find it there, while there are also one-man grazing runs on relatively safe winter country. The fertile river and valley flats provide some of the best arable mixed farms of some hundreds of acres from which are produced excellent wheat, barley, peas, grass and clover seed crops, and fat lambs. Irrigated farms of from 50 to a few hundred acres provide vigorous healthy-growing pasture for dairying and fat-lamb production. Irrigated holdings with 5 to 10 acres of orchard give good livings to orchardists producing the well-known Central Otago apricots, peaches, nectarines, cherries, and plums, while small fruits such as strawberries and tomatoes produce high returns per acre. All the above diversified types and intermediate types of farming are found in the Vincent County.



Approximately 45,000 acres are under irrigation in the county, and although this is only a small proportion of the total of 1,599,842 acres of occupied land, land under irrigation is responsible for a substantial proportion of the returns of the district.

MIXED FARM IRRIGATED BY BORDER DIKE SYSTEM

Farming methods practised on an irrigated mixed farm of 100 acres, the property of Mr. R. Barker, situated in the Manuherikia Valley a few miles west of Omakau at an altitude of a little over 1,000ft., are described in the first section of this article.

The Manuherikia Valley is situated between the Dunstan and Raggedy Ranges on the west and east repectively, and is bounded in the north by the Hawkden Range. The Manuherikia River flows approximately south and joins the Molyneux River at Alexandra. Irrigation water for the valley is obtained from the Manuherikia River. St. Bathans, Lauder, and Omakau are the three townships of the valley; the last two are on the railway line, and from them are railed the grain, grass and clover seed, fat lambs, wool and mutton, and some dairy produce.

When Mr. Barker took over his 100-acre block 10 years ago it was a wilderness of broom and gorse, carrying practically no stock apart from rabbits. It is composed of a light soil type ranging from a light gravel shingly loam to a light schist loam. The only building at that time was a cob house. After clearing the broom and gorse, sowing down an area in lucerne and the rest in pasture, using Certified ryegrass and clovers, and irrigating the whole area under the border dike system, the fertility has been built up, the area well subdivided, and a good range of farm buildings—cow-byre, sheds, and pig sties—has been built.

Stock

Stock carried consists of 25 Jersey cows, 5 heifers, 4 calves and a bull, 150 ewes, 3 Southdown rams, and 30 pigs.

Cropping

Nine acres of lucerne gives three good cuts of hay a year; 7 acres of Montgomery red clover is first cut for hay and then saved for a seed crop.

Threshed grass and clover swept up and stacked with salt give a rough type of hay.

Approximately 20 acres each year are ploughed up and sown in peas, turnip seed, mangolds, and a small area of potatoes.

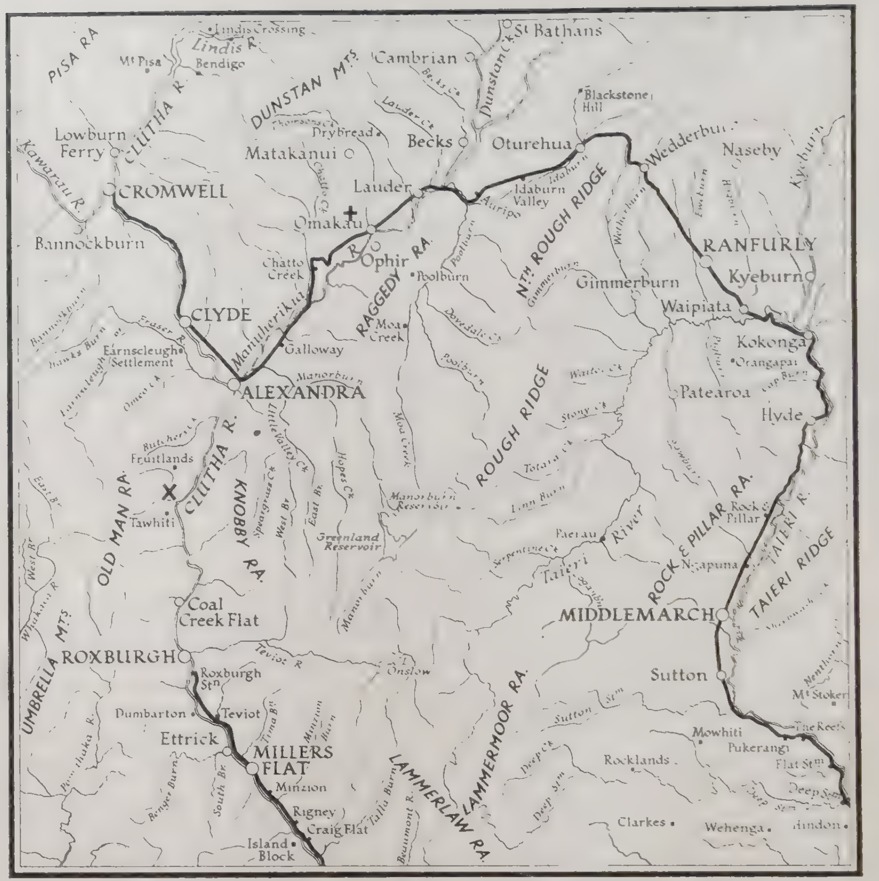
Approximately 20 acres each autumn are sown down in Certified ryegrass and clover for grass-seed production the following harvest and white clover seed the second year. The area is then grazed for a year or two before being ploughed up again.

Fertiliser

The full fertiliser ration is used with lime. Last season 20 tons of lime were applied to the farm. Superphosphate is applied during winter, and 20 acres are topdressed again early in November to carry the herd through the summer.

Labour

No permanent labour apart from the farmer's own is needed, although casual labour is used for cleaning water-races, when a flame-thrower is used for burning off grass growth and a shovel for cleaning the races. Occasionally a man is employed for a day or two at harvest time.


PISA RA
Lindis Crossing
Lindis R.
Mt Pisa
Bendigo
DUNSTAN MTS.
Cambrian
St Bathans
Blackstone Hill
Lowburn Ferry
CLUTHA R.
Kawarau R.
CROMWELL
Drybread
Matakanui
Becks
Oturehua
Wedderburn
Naseby
Lauder
Idaburn Valley
Omakau
Nth ROUGH RIDGE
Bannockburn
Chatto Creek
Ophir
Poolburn
RAGGEDY RA.
RANFURLY
Kyeburn
Gimmerburn
Waipiata
CLYDE
Manuherikia R.
Moa Creek
Kokonga
Orangapai
Earnscleugh Settlement
Galloway
ALEXANDRA
Patearoa
Hyde
ROUGH RIDGE
Fruitlands
OLD MAN RA.
CLUTHA R.
KNOBBY RA.
Tawhiti
Manorburn Reservoir
Greenland Reservoir
Rock & Pillar
ROCK & PILLAR RA.
TAIERI R.
TAIERI RIDGE
Paerau
Taieri River
Ngapuna
Coal Creek Flat
MIDDLEMARCH
UMBRELLA MTS.
ROXBURGH
Roxburgh Stn
Teviot R.
Onslow
Sutton
Mt Stoker
Dumbarton
Teviot
LAMMERMOOR RA.
Ettrick
MILLERS FLAT
Mowhiti
Pukerangi
Rocklands
The Reefs
Flat Stm
Deep Stm
Minzion
Rigney
Craig Flat
LAMMERLAW RA.
Island Block
Clarkes
Wehenga
Hindon

Mr A. Lindsay's farm shown.......X

Mr R. Barker's farm shown.......+

Irrigation

Irrigation is carried out under the border dike system using a volume of 3 cusecs. The size of borders varies, but they are usually about 5 chains by 30ft. Irrigation begins at the end of September in a dry season. If the land is moist, irrigation may not begin until well into October and is continued approximately every 3 weeks until the driest and hottest period of the year, when irrigation is carried out fortnightly.

During the earlier part of the season two borders may be irrigated simultaneously, but later the full volume is required to irrigate each border.

Water is ordered some days before it is required and the raceman in charge of the water arranges delivery as near as possible to that date, taking into consideration the requirements of other irrigators on the same water supply. Irrigation is usually carried on well into April. Last season was particularly wet and less irrigation water was used than for many years. With a good grass turf on the water-races and the small volume of water used combined with the fall of the land, no head-gates are required at the top of the borders. A sack dam is used with a fencing standard to hold it in place and water is raised to run through the opening in the bank (see photograph).

The water used over the irrigation season of about 7 months is 85 day cusecs, equivalent to 20in. of water per acre over the whole farm. If the

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farm were purely a grazing proposition, the amount of water used would be greater than 20in., as irrigation is very much reduced on areas closed up for seed production.

When irrigating pasture for grazing or for hay production the maximum amount of water the land will hold is supplied to produce the maximum amount or bulk of feed or hay, but for seed production, particularly clovers, only sufficient water is supplied to keep the crop healthy, reasonably short, and upright, thus reducing the bulk of material to be handled. Maximum amounts of water result in rank growth, lodging of the crop, and with clovers a long-drawn-out flowering season, frequently with sparse flowering.

At the end of October or the beginning of November, when the areas are closed up for seed production, weather conditions are usually hot and dry, and a good irrigation is required on this light soil type to ensure sufficient growth to produce a seed crop from the time of closing up. This usually carries the crop through until after the full flowering stage, when another irrigation is given, which is usually sufficient to carry the crop to maturity. However, no hard-and-fast rules can be laid down, as conditions vary from year to year and some experience is required to estimate the irrigation required, although the foregoing should give an idea of the general practice.

After the grass and clover seed crop is removed the area is irrigated and in a few days may be irrigated again, as the first time over the water does not penetrate sufficiently into the dry land. The ideal time to irrigate pasture is when the surface soil is moist and the second irrigation is given when the water will travel well and also be absorbed well.

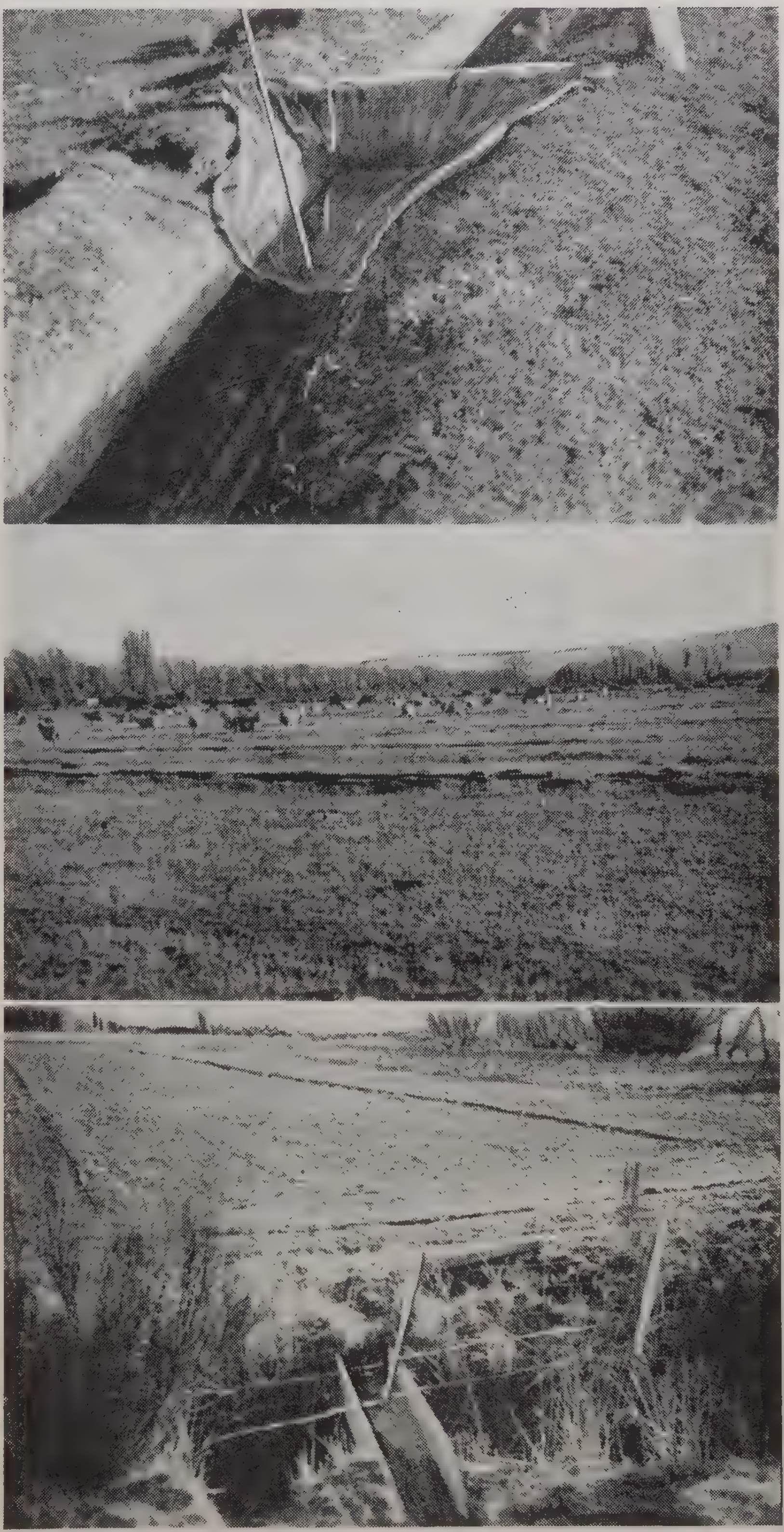
Garden peas are sown in September on the winter-fallowed land and harvested in January. In the particularly wet conditions of last season no irrigation was required, but in a normal dry season one or even two irrigations may be necessary, while under particularly dry conditions a third irrigation has been applied.

If only one irrigation is given, it is applied when the crop is in flower. However, if growth is slow and the weather dry, an extra irrigation is given well before flowering to boost the growth of the plants to provide stems to carry flowers and pods.

The main points to be borne in mind in irrigating for a seed crop are common-sense ones and can be tabulated as follows:—

1. Have sufficient soil moisture present to germinate seed without recourse to surface irrigation.

BORDER DIKE IRRIGATION



Upper—Head-race with sack dam held in position by a fencing standard; outlet to border is opposite standard on left. Middle—Bordered paddock with sheep and cows feeding on hay. Lower—Four acres bordered and sown in young grass; peas from previous crop showing up. On right 2 acres of mangolds.

2. Irrigate to supply moisture to produce the reasonable amount of stem and foliage essential to produce a crop. This irrigation, if required, will be given during the growing season if growth is short and conditions very dry. Guard against over-irrigating with resultant rank growth.
3. Irrigate to bring crop to maturity, i.e., to ripen off the seed without shrivelling it. This irrigation should be given while the plants are still in the green sappy stage but reaching maturity, i.e., the full flower stage.

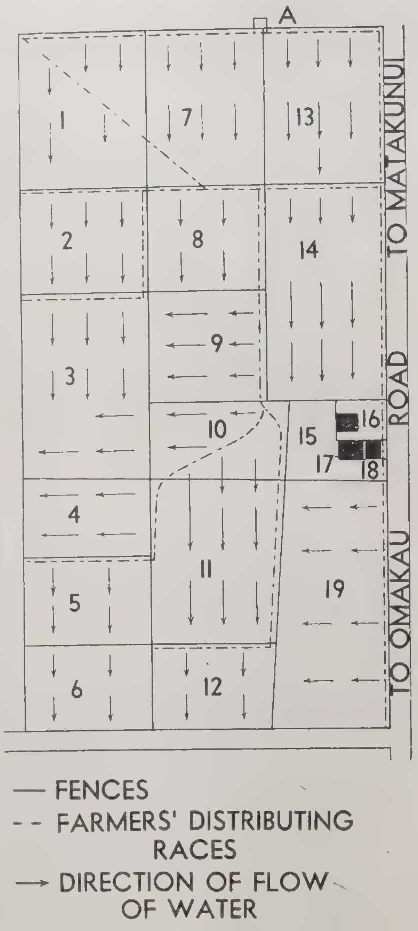
Implements

The full range of equipment on this farm consists of a tractor, header harvester, 2-furrow plough, drill, discs, tine harrows, cultivator, roller, leveller for constructing dikes, topdresser, mower, side rake, tractor sweep, and hoist for stacking. It is not suggested that every farmer starting on a holding of this size could buy a similar range of implements to begin with. These have taken time to acquire and each year some of the returns from the farm have gone back into machinery and gear, as it is necessary to have one's own equipment, especially in the production of small seeds, not only to harvest and save the full crop but to do so with the minimum amount of labour. A farmer with his own equipment does not risk any hold-up and consequent loss of seed which may occur when depending on a contractor.

Management

The milking herd is maintained at 30 cows and heifers. The best heifer calves are kept for replacements, and cull cows are sold. The cows calve in August and are dried off in May. A long winter-feeding period is experienced in Central Otago, when hay and some mangolds, supplemented by young grass, are fed from May until the end of September. During the period November to February, while grass and clover paddocks are shut up, the 20 acres of late-spring-topdressed grass carries the herd during the summer flush. The cows have the run of all the grass paddocks from February until next summer, when they are again allotted a 20-acre area that has had an extra topdressing.

Plan of Farm Showing Border Dike System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TO MATAKUNUI ROAD TO OMAKAU
— FENCES
- - FARMERS' DISTRIBUTING RACES
→ DIRECTION OF FLOW OF WATER

A. Intake from Government race. 1. Lucerne. 2. Ploughed for peas spring, 1945. 3. Pasture. 4. Young grass for harvesting 1945-46. 5. Pasture. 6. Pasture (white clover) to be harvested 1945-46. 7. Montgomery red clover. 8. Peas harvested 1944-45. Grass seed to be harvested 1945-46. 9. Mangolds and small area potatoes; young grass. 10. Pasture. 11. Pasture. 12. Swedes for seed production 1945-46. 13. Peas harvested 1944-45. Grass seed to be harvested 1945-46. 14. Grass seed harvested 1944-45; white clover to be harvested 1945-46. 15. Buildings and yards. 16. House. 17. Shed. 18. Cowshed. 19. Pasture ploughed for roots and peas for spring sowing 1945.

One hundred and fifty old ewes are bought each autumn and run with the cows on the grass and clover areas that have been harvested for seed and then irrigated. Southdown rams are put out with them in April. Approximately 100 per cent. lambing is obtained, and the whole flock, lambs and ewes all counted, are sold at the end of October or early November, when the grass paddocks are closed up for seed production. The ewes are wintered on hay, mangolds, and young grass. The feeding of both sheep and cows is carried out on alternative grass paddocks throughout the winter.

Pigs

Mr. Barker used to breed his own pigs, but now finds it suits him better to buy weaners during the late autumn and winter. They are fed on seconds of peas, small potatoes, mangolds, and meatmeal, and are sufficiently grown by the spring to use all the skim-milk produced. They are all grown to bacon weight.

Pasture Management

Well-sharpened tine harrows are frequently used to harrow pastures and scatter stock droppings. The general aim is to keep pastures young, and on this property they are limited to about four years of age. When the fields are ploughed up in May they are all carrying excellent turf. They are left lying to the frosts during winter, worked up in the spring, and sown in peas or roots. The previous season's root crop ground is also sown in peas. After the peas have been harvested the area is immediately worked and sown down in Certified ryegrass and white clover. All grass seed is autumn sown, which has been found more satisfactory than spring sowing. When a swede seed crop is grown the seed is sown in late February or early March, harvested about

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Christmas or New Year, and the land then sown down in grass and clover.

The accompanying plan of the farm gives the past and present seasons' cropping programmes.

* * *

DAIRY FARM IRRIGATED BY CONTOUR METHOD.

The district once known as Bald Hill Flat, nestling at the easterly base of the Obelisk Range, is now called Fruitlands. The apple and pear orchards which were planted there and which caused the change of nomenclature of the flat have gone, due in the main to the regular frosts of up to 30°F. at the 1,200ft. altitude of the district. The annual rainfall is approximately 15-20in., although last season was much wetter. This area of Vincent County 9 miles from Alexandra on the road to Roxburgh today consists of a number of irrigated dairy and sheep farms, most of which comprise a number of the original orchard holdings, the trees of which have been removed.

The following description is of the irrigated dairy farm of Mr. A. Lindsay, who kindly supplied the information for this article. (See location map page 364). The farm comprises 61 acres of medium to heavy schist loam, all of which is irrigated by the contour system. The uneven nature of the land and the fall, which ranges from well over a foot per chain to many feet per chain, necessitate the use of the contour system.

A purebred Jersey herd of about 25 head is carried. The actual figures for 1945 are 20 cows, 5 2-year-old heifers, 7 calves, and a bull. The remaining stock are 60 old Romney cross ewes, 3 horses, 2 sows and a boar; 36 young pigs were produced, all of which were carried to bacon weights.

Crops

A typical year's crops are 1 acre mangolds, 1 acre Certified potatoes, 1 acre Hardy Green Globe turnips, 17 acres Montgomery red clover for hay, and 6 acres oaten hay. Occasionally a grass paddock may be closed up for hay.

Each year a paddock is ploughed up by early winter, left to the frosts, worked up in the spring, and sown out in mangolds, potatoes, turnips, or carrots for sale to rabbiters. After the crops have been lifted the area is worked up again and sown out the following spring with oats and a grass seed mixture as follows:—Certified perennial ryegrass 20-25lb.; Certified white clover 2lb.; Certified Montgomery red clover 3lb.; crested dogstail 1lb.; and timothy 5lb. No irrigation is practised until after the green oats are removed for a hay crop in November. A topdressing of superphosphate is applied and the area is then irrigated and used for grazing.

BORDER DIKE IRRIGATION

Upper—Sheep and cattle feeding on hay with stock water flowing in head-race. Middle—General view of farm with dikes of borders in foreground. Lower—General farm view with Government supply race running through farm.

VIEWS ON THE CONTOUR-IRRIGATED FARM

Left—Montgomery red clover hay paddock. Right—Worked-up pig paddock in foreground, then bull paddock, then cropped area (potatoes lifted in centre, mangolds on right, turnips and fathen on left); grazing paddocks and house in background.

Left—Jersey calves on the farm. Right—Mangolds grown under furrow irrigation.

Left—Contour race along fence-line, showing outlets into hay paddock. Right—Stack yard with baled hay.

Two good cuts of Montgomery red clover are also harvested for hay. Silage has been made in the past, but because of the difficulty of obtaining any assistance during the last year or two the practice has been discontinued, although the value of silage in the feed ration before calving is realised. Lucerne used to be the main hay crop, but when it ran out Montgomery red clover was tried and is proving satisfactory. Hay is usually baled direct from the raked windrows.

Fertilisers

The full ration of phosphatic fertiliser is used with lime. When available superphosphate was applied in the autumn and late spring at 1cwt. per acre, with selected paddocks receiving sulphate of ammonia at 1cwt. per acre plus lime.

Irrigation

The irrigation season on this farm is of about 5 months' duration—from about the end of October until March, although it naturally varies with the season. Very little irrigation was required last season because of the unusually high summer rainfall.

Less irrigation water is required in this district than in the Clyde, Galloway, and Omakau districts, because of the heavier soil type and mountain rain showers in the spring and autumn. This also accounts for the shorter irrigation period of about 5 months for Fruitlands compared with the 6 to 7 months of other districts.

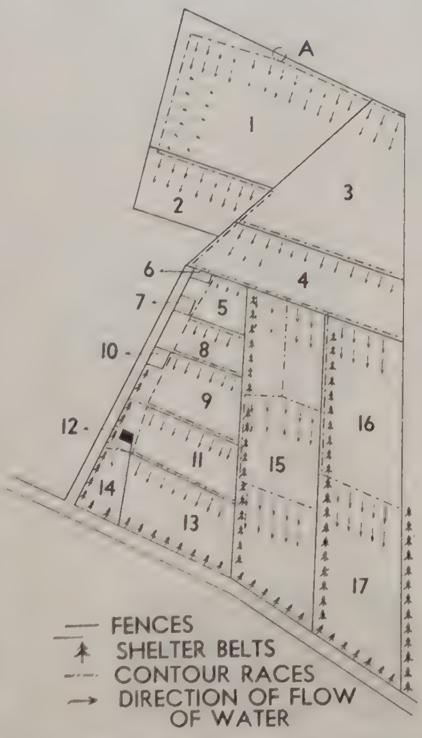
The fall of the land favours contour irrigation, which is carried out approximately every three weeks, using a volume of 2 cusecs. The water-races follow the contour of the land and are given a fall of a few inches per chain. The distribution of the water is made by damming the race, and the water trickles out from a number of openings a yard or two apart and flows over the land. Frequently the race is not dammed but the openings or outlets are regulated in depth and size with a shovel to allow a sufficient quantity of water to flow out.

A total volume of 34 day cusecs is used in a normal year, giving the equivalent of about 13in. of water per acre. The total amount of water used is relatively small, because a small area can be irrigated more economically than a large area, as a smaller head of water is required and the work of distribution can be dealt with more effectively, although the main reason is probably the good water-holding capacity of this type of soil, with no loss of water through drainage in the subsoil. The small amount of surface drainage of water is used on the lower paddocks of the farm. Also, a deep-rooting plant like Montgomery red clover on a heavy soil type does not require the same amount of irrigation water as on a light soil type with a shingly subsoil.

Potatoes, mangolds, and turnips are irrigated by running water down between the drills on which the crops are grown. The land is worked up in the spring and the ridges for turnips and mangolds are set up with a scuffler or horse hoe. In November the seed of turnips and mangolds is sown on the ridges with a small mechanical planter. Usually there is sufficient moisture present to carry the crop on until after thinning, when the first irrigation is made. Subsequent irrigations and scufflings of the crops are carried out every 3 weeks or so throughout the season, although the scufflings are discontinued as the foliage meets between the ridges.

The potatoes are planted as soon as the mangolds are sown. The drills are opened up with the scuffler, the seed and manure being sown by hand and the drills then closed by the scuffler. The area is tine-harrowed after a week or two. No irrigation water is applied until the potatoes are well grown and moulded up. Irrigation commences just before or when the flower buds are showing up, and from then on the land is not allowed to dry out, as any check to the crop by dry soil conditions will induce second growth with subsequent irrigations. King Edward is the most popular variety, with Arran Chief probably next, although Up-to-Date, Aucklander Short-top, Dakota, and Arran Banner all do well. The last-named is inclined to become hollow-hearted on heavy land.

Plan of Farm Showing Contour Method



A. Intake from Government race. 1. Pasture. 2. Hay (timothy and Montgomery red clover). 3. Pasture. 4. Ploughed for roots 1945-46. 5. Pig paddock. 6. Sheep yards. 7. Pig sties. 8. Bull paddock. 9. Roots 1944-45. Oats and grass in spring, 1945. 10. Cow yard and shed. 11. Pasture. 12. Homestead. 13. Pasture. 14. Pasture. 15. Hay (Montgomery red clover and ryegrass). 16. Pasture. 17. Hay (Montgomery red clover).

Labour

The farmer himself is able to do practically all the labour on the property.

Implements

The range of implements includes a single-furrow plough (for ploughing grassland), double-furrow plough (for ploughing after roots), cultivator, tine harrows, scuffler, small cultivator, mower, rake, hay-baler, and manure sower.

Management

Calving commences in August. The feeding of mangolds, turnips, and hay is carried on well into September before grass growth is sufficiently advanced to maintain stock. The herd is dried off again in May, when feeding with hay starts. All calves are kept, there being a ready sale for well-bred Jerseys. Bull calves may be sold at drop to 6 months old; 5 heifer calves are usually kept for replacement, and cull cows or heifers are sold. Up to two years ago, when the testing service was discontinued in the district, the herd was regularly tested for butterfat production, which ranged from 290 to 500lb. per cow and heifer.

Fifty to 60 old ewes (Romney cross, if obtainable) are bought in each

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autumn and put to the Southdown rams in May. At least a 100 per cent. lambing is obtained. Last season the lambs went away fat in February at 40.16lb. and ewes were sold fat a few weeks later. Ewes and lambs are all fattened on pasture. Old ewes are bought in again in April. Hay, turnips, and mangolds are used for winter feeding of cows and sheep.

Apart from the 36 young pigs bred, weaners are frequently bought and the lot carried through to bacon weights on skim-milk, small potatoes, and meatmeal. Mangolds and meatmeal are used for a winter ration for pigs.

Tine harrowing of the pastures is a common practice after they have been well grazed down and, if possible, just before irrigation. Paddocks are grazed more or less rotationally with the milking cows having first choice. They are followed up by the dry stock and sheep. If pastures tend to get ahead of the stock or become tufty, they are run over with the mower and tine harrowed. The main object of pasture management on this farm is to keep a good proportion of grass and clovers in the sward, to have the growth well controlled, and at the same time to maintain a vigorous, healthy growth of pasture.

The grass seed mixture of Certified ryegrass and timothy provides a permanent pasture of high feeding value, while the dogstail helps to maintain a dense sward and at the same time to provide a green "bite" during early winter and early spring. Certified white clover and Certified Montgomery red clover provide a permanent strain of high-producing clovers, which, with liming and topdressing with superphosphate, maintains a vigorous growth under the warm summer-irrigated conditions. In fact, the clover growth occasionally is inclined to dominate the sward, when sulphate of ammonia is applied to correct the position and boost on the ryegrass and timothy growth. Pasture growth is controlled by grazing and topping with the mower, while vigorous, healthy growth is maintained by irrigation and topdressing.

Bushel Weights in Common Use

			No. bushels per sack.
Barley ..	**50lb.**	**reckoned to the bushel**	**4**
Beans ..	**65lb.**	**" " " "**	**3**
Bran or Pollard	**20lb.**	**" " " "**	**7 to 10**
Maize ..	**56lb.**	**" " " "**	**3½**
Oats ..	**40lb.**	**" " " "**	**4**
Peas ..	**60lb.**	**" " " "**	**3¼**
Ryecorn	**54lb.**	**" " " "**	**3¼**
Wheat	**60lb.**	**" " " "**	**3**
Ryegrass	**20lb.**	**" " " "**	**6**

When any of the above grains are ground to a feed meal the bulk is thereby greatly increased and the reckoned bushel weight considerably decreased.

SIMPLE MEDICINES FOR SICK STOCK

By A. G. BRASH, *B.V.Sc., Veterinarian, Christchurch.*

MANY medicines used in the treatment of sick animals are simple ones which are to be found on most farms, or which may be bought at small cost. In this article a list is given of such drugs, and some of the uses to which they may be put are discussed. Used wisely, with careful attention to the correct dosage or method of application, a large number of complaints may be treated; if misused, they may do more harm than good.

IT is unwise for farmers to spend large sums of money on medicines without first obtaining veterinary advice as to the suitability of the drugs for the purpose for which they are being used. There is nothing magic about the way in which most drugs act, and success often depends on the care with which they are administered. Good nursing is of first importance. A painstaking farmer may achieve more with a solution of common salt in water than a careless one with any number of expensive drugs.

EPSOM SALTS (MAGNESIUM SULPHATE).

The well-known saline purgative Epsom salts is particularly suitable for cattle in doses of from ¾ to 1½lb. It should be given in warm water with 1lb. molasses, and the addition of 2oz. of ginger is an advantage, as it tends to prevent griping. A combination of equal parts of Epsom salts and common salt (sodium chloride) produces a more active purgative effect than does Epsom salts alone, and the following is a good purgative drench:—Epsom salts 6oz., common salt 6oz., ginger 2oz., molasses 1lb., water 3 pints. The dose of six ounces of each of the first two ingredients should not be exceeded, as it will be found that this is sufficiently severe. Severe purgatives should not be given when the animal is weak, and large and repeated doses should be avoided. As an after-calving drench when a cow fails to clean the above prescription is very suitable.

THE following are some weights and measures used in the dispensing of drugs:—

DOMESTIC MEASURES.

Teaspoon = 1 fluid dram
Dessertspoon = 2 " drams
Tablespoon = ½ " ounce
Breakfast cup = 8 to 10 fluid ounces.

WEIGHTS.

60 grains = 1 dram
8 drams = 1 ounce

MEASURES.

60 minims = 1 fluid dram
8 fluid drams = 1 " ounce
20 fluid ounces = 1 pint
30 c.c. = 1 fluid ounce (approx.)

Epsom salts are not suitable as a purgative for horses, but when a mild laxative effect is required 2oz. doses may be given in the food or drinking water until the desired result is obtained.

A suitable dose for sheep and pigs is 3oz.

As a hypodermic injection magnesium sulphate is used in the treatment of grass staggers in cows, 8oz. of a 25 per cent. solution being injected under the skin. Alternatively, magnesium sulphate (½lb.) may be given as a drench with 2lb. molasses, although results may not be as good as when given by injection.

Externally a saturated solution of magnesium sulphate applied under a bandage is a useful treatment for strains, bruises, or inflamed joints.

GLAUBER'S SALTS.

Sodium sulphate has uses somewhat similar to magnesium sulphate but is milder in its action. It is particularly suitable for sheep in doses of from 2 to 4oz., and is also useful for certain cases of colic in the horse, but for this purpose it is best administered by a veterinary surgeon through a stomach tube.

LINSEED OIL.

Linseed oil is often used as a purgative for horses and cattle. It is important to remember that only raw linseed oil is suitable for this purpose. Boiled linseed oil as used in the preparation of paints must not be given internally, as toxic effects may be produced. The dose of the raw oil for a horse is 1 to 1½ pints, and in cases of colic 2oz. of oil of turpentine may be added with advantage. Repeated or excessive doses should not be given to horses, as superpurgation or founder may result.

In cattle a dose of up to 2 pints may be given, and it is useful in cases where an active or irritant purgative would not be indicated, for example in ngaio or fern poisoning.

Linseed oil combined with equal parts of limewater forms carron oil, which is a useful application for minor burns or scalds. As a bland oil for external application linseed oil sometimes enters into the composition of skin lotions, and its use in this respect is mentioned under sulphur.

CASTOR OIL.

The purgative effect of castor oil is due to its breaking up in the intestine to form irritant substances. It is upon the action of these on the small intestine that the purgative effects depend. It is not a suitable purgative for adult horses or cattle, but is safe and reliable for use in foals and calves in doses of from 2 to 3oz. The condition of retained meconium in foals, that is constipation in the first day or two following birth, is best treated with a dose of castor oil followed by enemata of warm soapy water. A moderate dose of castor oil is indicated as a preliminary step in the treatment of scours in calves. Only boiled water should then be given at the next feed. The addition of one fourth part of lime water to subsequent feeds is very beneficial in such cases.

Castor oil is not often used as a purgative for dogs, other preparations such as liquid paraffin and cascara being more suitable.

The dose for a pig is 2 to 4oz. Applied externally castor oil is soothing to irritated skin surfaces. It is sometimes applied to the eye after injury or removal of a foreign body. In this way it acts as a protective and lessens irritation.

LIQUID PARAFFIN.

Medicinal paraffin is a mild laxative. It acts as an intestinal lubricant, and is particularly suitable for cases of chronic constipation in dogs in doses of up to 1oz. The addition of one third part of liquid extract of cascara increases its efficiency for this purpose, a teaspoonful to a tablespoonful, according to the size of the dog, being given as required. The dose for cattle and horses is one to two pints.

OLIVE OIL.

Given internally olive oil is a mild laxative and demulcent. As a laxative it is sometimes prescribed for dogs in doses of from ½ to 1oz.

Externally olive oil is soothing to irritated membranes, and combined with iodoform, as follows, it is particularly useful for the treatment of ear canker in dogs:—Iodoform 12 grains, ether 2 drams, olive oil, add to make 1oz. Apply every seven days. Thorough dressing and cleaning of the affected ear is an important part of the treatment.

TINCTURE OF IODINE.

One of the chief uses for tincture of iodine is for sterilising the skin before operations such as castration of pigs, for which it is very effective. More suitable antiseptics are now available as wound dressings, iodine being rather irritant. It is, however, a handy application for minor cuts and abrasions. Tincture of iodine is useful for the treatment of ringworm, and should be applied daily until the infection clears up. For the treatment of scabby mouth (contagious ecthyma) in sheep and lambs a suitable preparation consists of tincture of iodine 1 part, glycerine 2 parts.

LUGOL'S IODINE.

Lugol's iodine is a 5 per cent. solution of iodine in water. It is widely used for the treatment of temporary sterility in cows. The vagina should be irrigated with about a quart of the following solution two or three times between heat periods:—Lugol's iodine 4oz., salt 2oz., boiled water 1 gallon.

ACRIFLAVINE.

Acriflavine is one of the most useful non-irritant antiseptics for the treatment of wounds in all animals. It may be used either in the form of a solution of 1 in 2,000 to 1 in 1,000, or as acriflavine emulsion. Dirty wounds should first be cleaned by irrigating with ordinary salt and water (1oz. salt to a pint of water). Cotton wool should be thoroughly saturated with acriflavine solution and bandaged on. Acriflavine may be obtained in tablet form and fresh solutions made as required.

BORACIC ACID (BORIC ACID).

Boracic acid is a weak, non-irritant antiseptic. It is soothing to inflamed membranes and is often used for irrigating inflamed eyes, a teaspoonful being added to half a pint of boiled water. For the treatment of pink eye in sheep the following is suitable:—Boracic acid 10 grains, zinc sulphate 2 grains, water 1oz.

Boracic acid may also be used as a dusting powder for the treatment of wounds. Three parts of boracic combined with one part of slaked lime make a good dusting powder.

Boracic acid is also useful for the treatment of fly-strike in sheep. The dry powder dusted on the struck area is simple and effective.

The use of boracic acid as a solvent for calcium gluconate is mentioned under that drug.

STOCKHOLM TAR.

Stockholm tar is an antiseptic of mixed composition. It is obtained by distillation from pine wood and must of course be distinguished from coal tar, which is obtained by distillation from coal. It is a popular component of foot-rot dressings for sheep and cattle. Two parts of tar, one part of lard, and one part of powdered bluestone make a suitable dressing. Tar ointment composed of 14 parts tar, 1 part lard, and 5 parts beeswax is a useful hoof ointment and stopping for horses' feet. It may be applied on tow under a leather sole. Because of its thick consistency and tendency to repel flies, tar is a suitable application after certain operations, such as dehorning or speying. Oil of tar, which is distilled from tar, enters into the composition of skin lotions and is mentioned under sulphur.

OIL OF TURPENTINE.

Turpentine is obtained by distillation of pine resins and must be distinquished from mineral turpentine, which is used as a diluent for paint. Applied externally it is a disinfectant. It is too irritant for use undiluted, but it enters into the composition of many liniments.

Internally it is useful for the treatment of flatulent colic in horses, or bloat in cattle, 2oz being given in a pint of raw linseed oil. It may also be administered shaken up with milk. Turpentine in raw linseed oil will also

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effectively remove the large white worms (ascarids) of horses.

BLUESTONE (COPPER SULPHATE).

Applied externally copper sulphate is antiseptic, astringent, and caustic. It is widely used for the treatment of foot-rot in sheep, either as an ointment (see under Stockholm tar), or as a solution in a foot-rot bath. A 20 per cent. solution is suitable for treatment and 10 per cent. as a preventive.

Powdered bluestone is sometimes used for the removal of proud flesh, but care must be exercised in its use for this purpose. It is also a component of the following lotion for the treatment of greasy heels in horses:—Copper sulphate 1oz., zinc sulphate 1oz., lead acetate 1oz., water 1 pint. The lotion is applied twice daily.

A 2 per cent. solution of bluestone is used for the treatment of mycotic dermatitis in sheep.

Before the introduction of phenothiazine, bluestone combined with nicotine sulphate was the best drug available for the treatment of internal parasites in sheep and calves. It also has the advantage of being cheap. The mixture is made up as follows:—Bluestone 1lb., 40 per cent. nicotine sulphate 16 fluid ounces, water 5 gallons. The dosage is as follows:—Adult sheep 2oz.; two-tooths 1½oz.; lambs 4-12 months ¾oz.; lambs under 4 months ½oz. For the treatment of parasites in calves 8oz. of bluestone is dissolved in 3 gallons of water. Dosage: Calves 4 months 3oz.; 6 months 4oz.; 9 months 6oz.; 12 months 8oz.

FORMALIN.

Formalin is a disinfectant. Undiluted, it is caustic and irritant. For the treatment of foot-rot in sheep it gives good results. For the foot-rot bath one part of formalin is added to 15 parts of water, the sheep being kept in the solution for 10 minutes and then held on battens to dry. For the hand dressing of individual sheep after paring, a stronger solution, 1 part formalin to 3 parts water, may be used.

Formalin is also a useful preservative when specimens are being forwarded to the Animal Research Station, Wallaceville, for examination. Milk samples for mastitis examination should have two drops of formalin added to each 1 ounce sample if transit is likely to take some time. Other specimens should be placed in a suitable container such as a preserving jar and 1 part of formalin added to every 15 parts of water.

KEROSENE.

Kerosene is too irritant to be applied undiluted to the skin of animals and should not be used for such purposes as the treatment of mastitis. As an emulsion, however, it is excellent for the treatment of lice in cattle and horses, and scaly leg in poultry. For the treatment of lice the emulsion is made as follows:—Soap 1lb., water 1 gallon, kerosene 1 pint. Dissolve the soap in boiling water and allow to cool; then mix in the kerosene thoroughly, preferably with a spray pump. The treatment should be repeated in 14 days' time to kill the lice which have hatched out from eggs which are not destroyed.

For the treatment of scaly leg in poultry the emulsion is made somewhat stronger:—Soap 1lb., water 1 gallon, kerosene 2 pints. This is applied after a preliminary scrubbing with soap and warm water to soften the scales.

NICOTINE SULPHATE.

Nicotine sulphate is usually obtained as a 40 per cent. solution. Directions for its use in the treatment of internal parasites in sheep and calves are given under bluestone. One ounce added to 6 gallons of water may be used for the treatment of lice in cattle and horses, the hair and skin being thoroughly wet. Horses should not be treated when warm after exercise. Repeat the treatment in 14 days.

For the treatment of internal parasites in poultry 1oz. of nicotine sulphate and ½lb. of Epsom salts are added to the water with which the mash is mixed, this being sufficient for 100 birds. The birds are starved the day before the treatment is given. Tobacco dust fed at the rate of 2 to 3 per cent. of the mash may also be used.

DERRIS.

The powerful insecticidal properties of Derris root powder are due mainly to its rotonone content, which may vary considerably with different samples. Dusted into the coats of dogs it is an effective treatment for fleas.

WASTE OIL.

The waste oil from motor-cars has considerable usefulness for the treatment of lice and mange in pigs. Crude oil may also be used for this purpose. Applied by hand the oil should be distributed over the entire surface of the head and body of the animal. Pigs should not be treated when they are overheated. Freshly-oiled pigs should not be forced to move rapidly or be exposed to bright sunshine. Plenty of shade should be provided. Specially-constructed dips may also be used, about a quart of oil being added to the water for each pig to be dipped.

SULPHUR.

The usual form is sublimed sulphur. Sulphur is also obtainable as precipitated sulphur, which is finer and is preferred for the preparation of ointments and lotions. Sulphur is widely used for the treatment of skin affections in dogs. One part of sulphur mixed with six parts of olive oil makes a useful lotion. Dogs suffering from eczema should not be washed too frequently, as washing removes the natural oil from the skin and makes it more open to infection. The following is also a good skin lotion for certain cases of eczema:—Precipitated sulphur 1oz., oil of tar 2 drams, linseed oil to make 4oz. Apply every third day.

CALCIUM GLUCONATE.

The chief use for this calcium salt is in the treatment of milk fever in cows and ewes. When used by a farmer the solution is usually injected under the skin of the neck or behind the shoulder. Its solubility is greatly increased by the addition of boracic acid, the compound calcium boro-gluconate being formed. This enables a smaller amount of water to be used, which is an advantage, as the larger the amount of fluid introduced under the skin the greater is the danger of septic complications. The solution is made up as follows:—Calcium gluconate 2oz., boracic acid 3 drams, water 10oz. The powdered ingredients will readily dissolve when the mixture is boiled. This is one dose for a cow or two doses for a ewe. Larger amounts may be made up and kept in a sterile bottle, a crystal of thymol being added to prevent the growth of mould. The solution should be boiled before use.

SODIUM BICARBONATE (BAKING SODA).

Externally sodium bicarbonate is sedative to the skin, and made up into a paste it may be applied to minor burns, erythema, bites and stings of insects, etc. A solution of sodium bicarbonate is excellent for dissolving scabs and exudates before applying other treatment.

Internally it is of service in overcoming gastric and intestinal indigestion due to excess acidity or flatulence. The doses are: Horses and cattle, ½ to 2oz.; sheep and pigs, 1 dram to ½oz.

GINGER.

Ginger is mainly employed as an aromatic stimulant to encourage movement in the stomach and intestines, and the expulsion of gas from them. It is frequently administered with purgatives to counteract the griping action of these agents. The dose for cattle is 1 to 2oz. When there is impaction of the first stomach in cattle ginger is a favourite drug, combined with nux vomica. The following is a useful formula for this purpose and is also a good stimulant for cows down with paralysis after calving: Ammonium carbonate 3oz., nux vomica 1½oz., gentian 6oz., ginger 6oz.; divide into six powders and give one twice daily as a drench in water or a thin gruel.

WINTER FEEDING

★ In certain districts winter feed will be scarce. Every scrap of hay and every pound of fodder should be used to best advantage.

- ★ Avoid waste from trampling by feeding chaff and concentrates in troughs and hay from racks.
- ★ Where racks are not available feed hay and silage on dry ground, a forkful at a time at wide intervals.
- ★ On dairy farms root crops should be pulled and distributed sparsely on dry ground.
- ★ Fed-off crops should be carefully rationed in breaks by allowing stock in for short intervals each day.

★ See that fences round hay and silage stacks are in good order.

FARM WORK FOR MAY

By the Fields Division

PASTURES

Preparation of Land for Grass.—Heavy virgin sour soils, such as the gumlands of North Auckland, should be deep ploughed or otherwise deeply cultivated this month in preparation for grassing next autumn. They should be left over the winter in this state.

* * *

Grazing New Pastures.—Some autumn-sown pastures will now be ready for their first grazing. They should be grazed rapidly with light stock and left to recover before next grazing. Grazing should not be too severe, nor should the grass at any time be permitted to grow so long that it will smother or inhibit the growth of young clover plants.

* * *

Grassland Management.—Dairy farmers were advised to close up fields in April for provision of feed for early calvers. Except in the colder districts, one or two more fields should be shut up for the same purpose early this month, fields in good heart being chosen for this purpose. Greater growth will be secured, except in districts where severe frosts are experienced in May, if 1cwt. per acre of sulphate of ammonia is applied. Such fields should provide valuable fodder in June and July.

HAY AND SILAGE

Hay feeding should begin before grass growth ceases, stacks being opened on the leeward side of the prevailing wind. Silage stacks may be opened at the side with a hay knife, a silage knife, or sharp spade, or from the top if the stack is not too large. Waste material from silage and hay stacks should be saved for the garden or crops. Tracks to and from silage pits should be cambered and metalled, if not concreted, so that they do not become impassable from continuous use in winter.

LUCERNE

Keep stock off the lucerne stand. Plough ground for new stands this or next month. If out of grass, skim plough this month and deep plough next month after top-working the sod.

ROOT CROPS AND CEREALS GREENFEED

Start feeding swedes, chou moellier, and late season soft turnips to sheep and dairy cows. In frosty weather remove stock from crops in the evenings and do not permit their return until the frost thaws next day. Provide hay, straw, or chaff to stock on roots and provide a grass run-off.

Pigs should by now be accustomed to their winter diet of roots and meatmeal.

Oats may be sown in mild districts for early spring feed. It is too late to sow cereals for winter feed.

POTATOES

Digging of potatoes should be completed this month. See that potatoes in the pit are well protected from rain and frost and that ventilation is provided.

CEREALS FOR GRAIN AND CHAFF

Oat-sheaf Chaff.—See that the chaff house is kept full. Wage war on vermin.

* * *

Autumn-sown Cereals.—Finish sowing oats for grain and chaff early this month. Sow wheat as soon as oat sowing is finished and remember to see that the seed is dusted against smut. Poor strikes of autumn-sown barley or oats may be replaced by wheat after discing, cultivation, and harrowing. Land for autumn-sown cereals should be fine and firm below with small lumps on top.

* * *

Cultivation for Spring-sown Cereals.—Plough vacant land for spring-sown cereals.

Maize Harvest.—Maize harvesting should begin and, if possible, be completed this month. See that roofs of maize cribs are water-tight and that they are vermin proof.

STOCK

Management of Dairy Herd.—Run last year's calves ahead of the cows in the rotation, for they do much better that way. See that they are given their daily quota of good hay.

* * *

Pigs.—Sell all pigs which cannot be wintered on foods available.

* * *

Management of Sheep Flock.—In the North Island, where hoggets are mainly wintered on pasture, they should be placed on sweet, short, clean feed. Dose and crutch them. In the South Island and other parts, where fodder crops are available, give the hoggets the leafy parts of crops, reserving the bulbs of roots for mature sheep with good teeth. While the hoggets are on the crops give them some dry feed such as hay or chaff.

Keep a regular watch for cast animals among the breeding ewes.

Breeding ewes in the early-lambing districts should be crutched this month.

After tupping the rams should be placed on good feed. Put all sheep through the foot-rot bath from time to time and treat affected feet.

GENERAL

Clean out drains and culverts, repair bridges, cut hedges, repair implements, and see that they are well housed. Effect repairs to sties and pig pens. Clean out accumulations of cowyard manure and spread it on the pastures so that it will produce some winter feed. Overhaul dairy shed machines and other equipment. Repair fences and see that stacks are secure from stock. Prepare warm, dry, well-ventilated quarters for coming season's calves. Repair sheep yards. Except in districts with very severe climates, plant trees for shelter and timber production.

"PIGS FOR PROFIT."

Pig farmers will find much practical information of value in Bulletin No. 212, "Pigs for Profit." This bulletin is free and is available from the Department of Agriculture, Auckland, Wellington, Christchurch and Dunedin.

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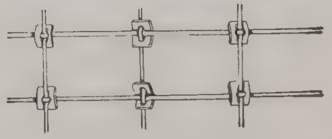

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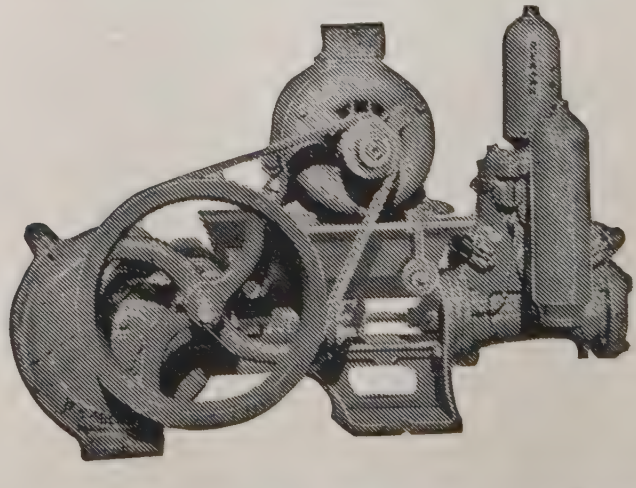

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WINTER FEEDING OF DAIRY COWS

By E. R. MARRYATT, *Fields Instructor, Whakatane.*

WHEN cows start the winter in very low condition, improvement is difficult to achieve. For successful wintering, therefore, cows must be in good healthy condition towards the end of their lactation period. This necessitates sound autumn feeding—a point which is emphasised by the writer of this article as a preliminary to a general discussion on winter feeding of dairy cows.

COWS which calve in poor condition in the spring first put some flesh on their bodies before putting much milk into the vat, and instead of reaching their peak production in about six weeks from calving they take much longer and produce less. For this reason alone, the feeding of the dairy cow during the winter must be liberal enough to build up her body reserves which have been depleted by previous lactation. This should be done without sudden changes in diet by gradually improving the quality of the feed up to and after time of calving. During the winter the ration not only has to provide sufficient energy to maintain the cow in her present condition under severe weather conditions but also has to provide sufficient protein, ash, and vitamins to meet the heavy demands of advancing pregnancy.

Winter feed must be nutritious and digestible although it may well be more bulky and less concentrated than feed required by the cow when in full milk.

Balancing the Ration

Main winter feeds for dairy cows are hay and roots, or hay and silage. Pasture hay contains only about 15 per cent. of water, roots about 90 per cent., and green pasture grass, which is the normal fodder for the cow, about 75 per cent. The digestive troubles which occur when the cow is fed hay alone, or roots alone, are, therefore, easily understood. Hay alone, and for a bull, hay alone and no exercise, commonly causes impaction.

If, as will be common this winter, the ration for dairy stock unavoidably consists of hay alone or other roughage such as cereal straw, then molasses may be used to aid digestion. Usually this feed is broken down with water and sprinkled on the hay the day before feeding out. An adequate supply of good drinking water is also essential for digestion of much roughage. Roots alone, especially if half-frozen and fed on an empty stomach, frequently cause digestive troubles. Hay should be placed in the field first thing in the morning and the cows allowed to eat some of it before the roots are thrown out to them. The ration must be balanced so that it contains both dry and watery feeds. Normal allowance for the average cow would be about 14lb. of good hay and 40 to 50lb. of mangolds, or about 10lb. of good hay and about 50lb. of good silage. Heavier feeding of the higher-producing cows is necessary. The rations mentioned are well balanced for nutrition and for bulk as well as for water-content. The cow will balance her own ration if a sufficient variety of fodders is provided for her; she seldom has an opportunity to do this because insufficient is provided and she has to eat everything she gets. Good feeding consists in accurately judging and providing the cow with the correct amounts of the different feeds.

The agricultural chemist by research work has provided the farmer with much information about the nutritive values of feeding stuffs which enables him with confidence to balance the ration.

Hay should be placed in the field first thing in the morning and the cows allowed to eat some of it before the roots are fed out.

Nutritive Ratio

Nutritive ratio is the ratio which exists in any fodder between the digestible crude protein and the combined digestible carbohydrates and fats. Digestible crude protein is stated as 1 and is expressed first in the ratio. A nutritive ratio of 1 : 7 as for perennial ryegrass is regarded as narrow or rich in protein, and one of 1 : 4 as for lucerne hay as very narrow or very rich in protein. An example of a very wide nutritive ratio is 1 : 10 for green maize which is too wide for milk production unless fed with green lucerne, concentrates, or young grass. Wheat straw has an extremely wide nutritive ratio of from 1 : 336 to 1 : 342. Young pasture grass 4in. to 6in. high with a nutritive ratio of 1 : 4 to 1 : 5 is a food ideal for milk production; successful feeding of dairy cows consists largely in the maintenance of a supply of pasture grass in this condition for as long a period as possible during the milking season. All other feeds given to dairy cows in New Zealand are intended to make up for deficiency in pasture grass during certain periods. Those for winter feeding when the cow is dry are satisfactory if they have a wide nutritive ratio.

Winter Fodders

Permanent-pasture hay: Most hay used on dairy farms is cut from permanent pasture, is usually deficient in clovers, and has a wide nutritive ratio, say 1 : 9. It should be remembered that as grasses get rank their nutritive ratio widens except for grasses which ripen their seed unevenly, as does meadow foxtail. Permanent-pasture hay is satisfactory for feeding when cows are dry.

Temporary-pasture hay.—This usually consists of Italian ryegrass and red clover, or one of these species on its own. The nutritive value of these hays is narrow, about 1 : 6. Very little of this type of hay is saved on dairy farms except in the South Island where dairying is combined with mixed farming.

Lucerne hay.—Lucerne hay is common in certain districts, has a very narrow nutritive ratio of 1 : 4, and is very suitable for feeding towards the end of the winter and early in the spring to the first calvers.

Silage.—The feeding value of silage depends on the crop from which it has come and the manner in which it has been made—that is, whether it has been made into sour or sweet silage. Sour-grass silage, for instance, has a nutritive ratio of 1 : 7 and sour-lucerne silage of 1 : 3, while sweet-grass silage has a nutritive ratio of 1 : 9 and sweet-lucerne silage of 1 : 4.

Maize alone, because of the difficulty of packing it tightly and excluding the air, does not make good silage, unless it is chaffed, as is common in America where the chaffed stalks are then blown into a permanent silo. Maize packs quite well in a silage pit if it is cut into short lengths. This year some farmers have ensiled maize intended when sown for crop maize simply to increase their winter rations for their stock. The nutritive ratio of maize silage is 1 : 13.

Roots.—In some dairying districts good yields from swedes are hard to get because of pests and disease; mangolds and other crops are more widely grown by dairy farmers. Successful growing of mangolds necessitates considerable labour in cultivation, but the yield is high, the mangold keeps well into the spring, and, unlike turnips, it produces no taint in milk and cream. Mangolds should remain in the pit for at least six weeks before being fed to stock. This allows the full development of the sugars. Soft turnips are normally grown for summer feeding, but because of feed shortages through the long summer drought, some farmers intend (at time of writing) to catch the autumn rains with sowings of softs for winter feed. Carrots, which are not normally grown for dairy cattle, are occasionally used for this purpose. The nutritive ratio of roots generally is wide and for mangolds is from 1 : 11 to 1 : 14, depending on the variety; for swedes it is 1 : 7; for turnips 1 : 9; and for carrots 1 : 12.

Green cereals.—Cape or Black Skinless barley or Algerian oats are easily grown, requiring no after-cultivation and being fairly free from disease. When autumn sown they provide valuable additional winter fodder and assist in the stimulation of milk flow of early-calving cows. When immature, green cereals have a narrow nutritive ratio. Green cereals are being grown by some farmers this autumn for the same reason as turnips are being grown by others, but with more certainty of success.

Chou moellier.—Chou moellier is much more resistant to dry rot and to insect attack than the swede and for this reason is more commonly grown in some districts. The medium type is probably more suitable for feeding to cows as it is more leafy. The nutritive ratio of chou moellier is 1 : 5; like green cereals, therefore, it should be fed out in the late winter and early spring to the first calvers.

Concentrates. — Concentrates are feeding stuffs low in fibre and rich in digestible matter. They are used to supply easily-digestible food so that the animal does not have to eat so much. When concentrates are required for milk production and therefore are intended to supply protein which is deficient in the coarse fodder,

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About 12 to 15cwt. of good hay, or its equivalent, is required per cow for the winter if the herd is to be adequately fed.

they should have a narrow nutritive ratio, say, 1 : 2. When concentrates are fed simply to supply easily-digestible proteins and carbohydrates mainly for maintenance to save the cow eating very large quantities of coarse fodder which may be beyond her capacity, a nutritive ratio of 1 : 5 or 1 : 6 is quite satisfactory. With very high-producing cows care should be taken not to overdo concentrate feeding. Concentrate feeding on a large scale has seldom been attempted in New Zealand because of the cost compared with young growth of permanent pastures, which in effect is a watered concentrate, and because of the ease with which supplementary crops can be grown.

The following table shows the composition of some concentrates.—

Concentrate.	Digestible protein.	Nutritive ratio.
Linseed meal	30.2	1 : 1
Linseed nuts		
Bran	10.9	1 : 4
Crushed oats ..	8	1 : 7
Barley meal ..	6.5	1 : 10
Maize meal ..	7.1	1 : 9

Faulty Winter Feeding

More common than the feeding of hay alone or roots alone is the fault of insufficient feed. That there are many dairy farms where the cows are fed to their maximum production and feeding capacity is freely acknowledged; on the average dairy farm the feed provided for the winter, as a rule, could well be doubled. Too much reliance in the past seems to have been placed on Nature's providing a "normal" season, and insufficient reserves of hay and silage have been built up to meet unexpected demands which, in the light of experience, may be expected in at least two out of every five seasons. It is the so-called "normal" season which is really abnormal.

The exceptionally long summer drought which has been experienced in many districts of the North Island, for example, has used up next winter's fodder at an alarming rate. For many farmers the problem of keeping their stock alive in the coming winter looms larger than that of feeding them adequately.

Unless they are wintered well, cows cannot be expected to produce to their capacity next season. About 12 to 15cwt. of good hay or its equivalent is required per cow for the winter if the herd is to be adequately fed. Those who are short of winter fodder and are willing to accept any means of easing the position may consider rugging their cows to reduce the amount of feed needed to maintain body temperature.

CHICK RAISING

A GOOD or a bad chick-rearing season can have such far-reaching effects upon the future of a poultry farm that no one can afford to miss an opportunity of increasing his knowledge of this subject. A new bulletin has just been published which contains much new information on natural chick-raising and on the different methods of artificial chick-rearing. This bulletin is suitable for both the small poultry farmer and the commercial poultry producer. Write to the Department of Agriculture, Auckland, Wellington, Christchurch, or Dunedin for Bulletin 199, "Poultry Keeping, part 5: Chick Raising." Price 6d.

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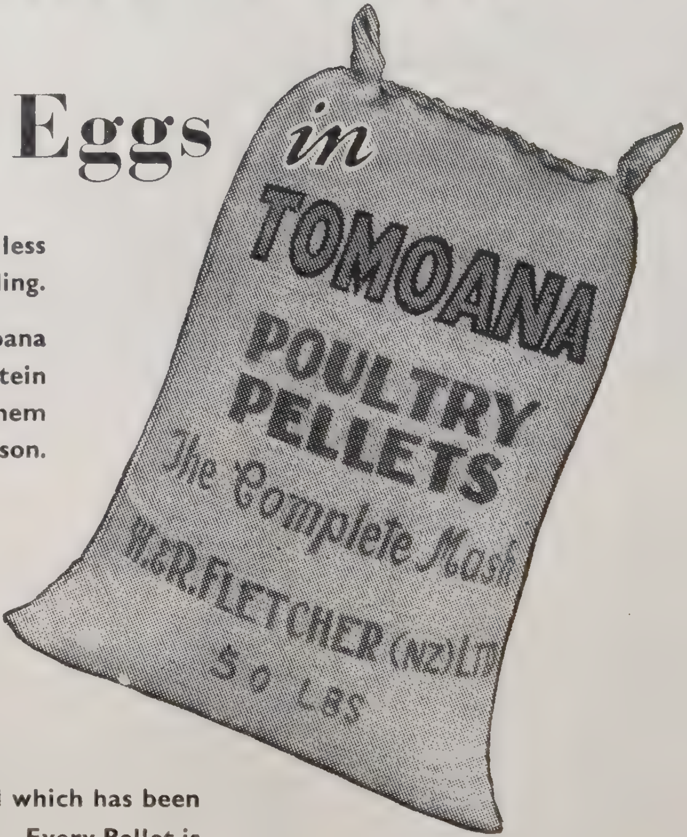

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PREPARING FOR THE INCUBATION SEASON

By S. G. HADDON, *Poultry Instructor, Wellington.*

"A STITCH in time saves nine" is an old proverb, which applies to incubation as much as to the button hanging by a thread. Poultry farmers are in no way different from the mass of people who put off till tomorrow what they should do today. In another two months incubation will be starting again; odd jobs in the incubator room and on the incubator should be done now.

STARTING at the top and working down, and working from the inside to the outside are useful rules to remember. Like all rules, however, they may be broken.

Nearly every farmer at some time or another uses his incubator room as a store room for unwanted odds and ends; they may be egg or chick boxes, leaflets and advertising matter from various stock firms, the spray pump that was used on the potatoes just round the corner, tools, buckets, and just plain rubbish. There seems to be no limit to the variety found in an incubator room.

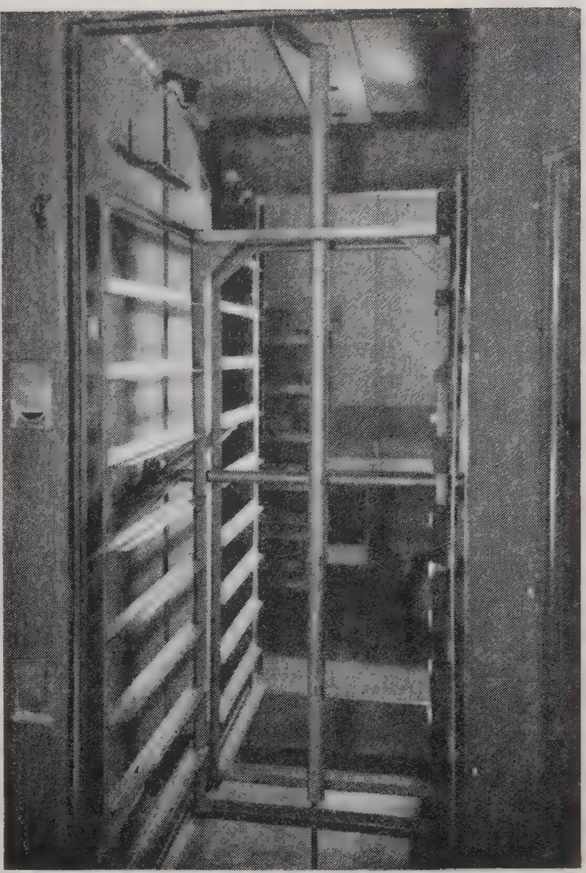
Incubator Room

First step in preparing for the incubation season is to clean out the incubator room. When the shelves and benches have been cleared, scrub them, and with a hard brush scrub the floor, using plenty of hot water and washing soda and soap. A small amount of disinfectant in the water may be used if desired.

Disease may be prevented more easily than it is cured and most important in prevention is cleanliness. Start the chicks off right by maintaining a clean incubator room.

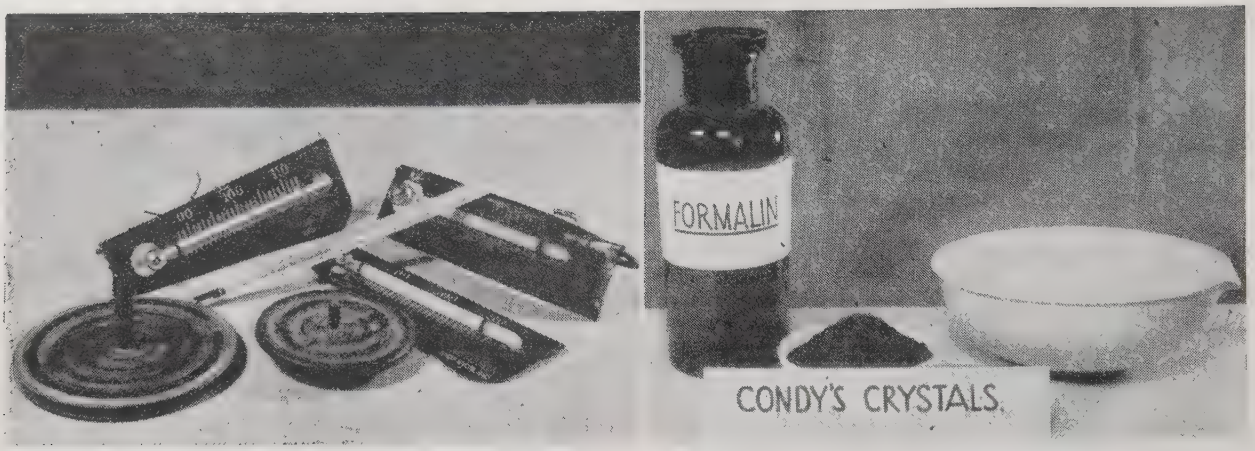
Make certain that necessary carpentry work is attended to and that the ventilators are in good condition and not blocked with cobwebs or other rubbish. Replace the temporary bench made of a board and two boxes with a properly-constructed bench. Fit extra shelves and keep the floor cleared. As chick boxes are necessary adjuncts to an incubator look through the supplies of boxes on hand and destroy by burning those which are dirty, used, and dilapidated.

When the room is in first-class order, attention should be given to the incubator. Incubators, broadly, are of two types—cabinet and flat tops. With the cabinet type, remove any rubbish from the top. An incubator is in many respects a precision instrument and it should be treated as such, not as something on which to store things. Remove from the interior all egg and chick trays, water-troughs, and detachable thermometers, and place them away from the machine. With a dust-pan and brush or small vacuum cleaner, remove all loose dirt from the inside of the machine. The interior may then be scrubbed, using plenty of hot water and soap. The fittings, chick trays and egg trays should already be clean from the last hatch of the previous season. Make certain they are clean. Some operators prefer to dry-clean this part of the equipment by using wire brushes and no moisture.



Upper right—Strip the interior of the incubator.

Lower right—Fit extra shelves in the incubator room and keep the floor clean.



Left—Test and check thermometers and capsules. Right—Fumigate with these ingredients before and during every hatching.

Examine the electrical equipment and see that there are no loose connections or frayed wires. Be sure that the cut-outs are in good working order and not clogged with fluff. If capsules are employed, as they often are, test them in warm water. Test the tension of the belt between fan and motor and, if lubricators are provided on the shaft, then use them. Most electric motors have sufficient lubrication packed in the bearings to last the life of the motor, or else the bearings are of a type which do not require lubricating. Some oil or grease on the fan shaft will do no harm.

Examine the testing lamp, replacing the padding round the opening, if it is worn. Those who carry out custom hatching will require a good supply of small cards of various tints for labelling the different customers' eggs.

While flat-top incubators require different treatment, cleanliness and neatness of the incubator room are still essential.

Testing Capsules

A flat-top machine should be stripped down until it is a mere shell, and everything taken out should have a thorough scrubbing. The control mechanism, usually consisting of one or two expanding capsules or wafers and a system of rods, should be dismantled and the capsules tested in warm water. This is to make certain that they expand on warming and do not leak.

> **A leaking capsule will give off a strong smell of ether, a volatile and inflammable liquid. Do not test a capsule by holding a lighted match to it. Endeavour to obtain some spare capsules. These have been in very short supply in the last few years, but the position is now easier.**

When testing capsules, test the thermometers at the same time, using a clinical thermometer or one which is known to be accurate. While it is preferable for a thermometer to register the correct temperature, an inaccurate one may be used, provided it gives **a constant error.** A thermometer which registers consistently 1 deg. lower, for example, is quite satisfactory to use, because due allowance may be made for this constant error. Avoid using a thermometer the readings of which fluctuate. If wet-bulb thermometers are used, test them by comparison with a known accurate thermometer and make sure the cotton strands or wicks around the mercury bulb are in good order. These strands sometimes become covered with a mineral deposit which affects the rate of evaporation of the moisture, giving a false reading. Always use distilled water or rain water for wet bulbs and avoid this trouble.

If it is possible with a hot-air or hot-water machine to remove the flat top, do so. In this way access to the air ducts or hot-water pipes is provided. The air ducts should be clean and free from blockage of any sort. The hot-water pipes will require emptying and swilling out thoroughly with a strong solution of washing soda and hot water to remove any rust or scale which may have formed inside. This work may be done by a repeated flush, or the pipes may be filled and left to stand for some hours—followed by a thorough rinsing.

While the top is off, clean all the soot away from the boiler, both outside and inside, and satisfy yourself that the lamp flues and chimneys are clear of soot, and, most important, fit snugly together without leaving air leaks and draughts in the wrong places. Mica windows should be cleaned by using rag moistened in kerosene or replaced with new mica. The only way to prove that an oil lamp is burning correctly is by observation through a draught-proof window. While attending to the lamp and flues, replace all used wicks with new wicks of the correct size. It is false economy to use a wick for more than one season, as an old short wick can never be relied on to give an even burning flame.

Assemble the machines together, making certain that everything is in its correct place and that all moving parts may move freely. It is essential to check that the machine is absolutely level, thus avoiding any high corners which would run unduly hot. Always give an incubator a trial run before placing the first setting of eggs in it. As an incubator dries out during the period when it is not in use, run it at the correct working temperature for several days before the hatching season starts and provide plenty of moisture in the moisture trays. Excessive drying off of the first eggs put down in the machine will not be apparent if this is done.

A wise precaution, and one which should be standard practice, is to fumigate any incubator before each hatch. This is simply done by placing a dish of Condy's crystal (potassium permanganate) inside the machine and pouring on some formalin. Formaldehyde gas which is generated is extremely efficacious in the control of pullorum infection of chicks while they are still in the incubator.

Your local Poultry Instructor will be pleased to furnish full particulars of the technique involved and the correct amounts of chemicals to use: these vary with the size of the incubator. As a matter of general interest the proportions per 100 cubic feet of air space in the incubator are as follows:

Formalin: 35 cubic centimetres, or 24 grammes.
Condy's crystals: 17.5 grammes.

Take care not to inhale the formaldehyde gas as it has unpleasant effects.

COMMERCIAL TOBACCO CULTURE

By N. J. ADAMSON, *District Supervisor, Horticulture Division, Nelson.*

THE tobacco plant is a native of South America, and, like the potato and the tomato, which come from the same region, is susceptible to frost injury. In New Zealand, the plant has been grown most successfully on a commercial scale in the Nelson district, where tobacco growing has become a major horticultural industry.

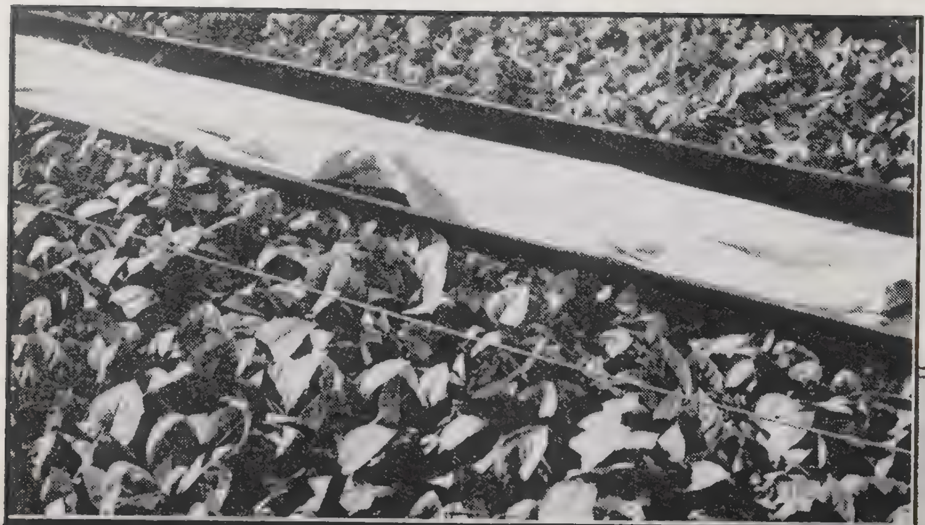
With proper culture, selection of suitable varieties, and proper curing, it has been established that leaf of good quality and appearance suitable for manufacturers' requirements can be produced in quantity economically and is in demand.

IN tobacco culture and curing sound intelligence and reasoning faculties are essential, as it is more liable than most ventures to eliminate the rough-and-ready as against the studious and energetic operator. There is no straight and easy road to success in tobacco growing; one cannot follow a laid-down rule and always obtain similar results. Variations are constantly occurring which can be met only by sound judgment built on experience. Variation is found in soil, climate, and variety grown; weather and seasons are ever-changing. Seldom are temperatures and humidity relatively the same for even short periods, and even plants differ side by side.

Varieties to Grow

The question of a suitable variety of tobacco to grow in a particular locality will be governed largely by the soil and climatic conditions. Varieties for which there is little or no demand should not be grown. In

RAISING TOBACCO SEEDLINGS



PLANTS IN BEDS READY FOR PLANTING.

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TOBACCO seed production is a task for the specialist, as uniformity in type and quality are of supreme importance in tobacco stocks. Though better-quality tobacco is grown on soils comparatively deficient in organic matter and of poorer nitrogen content, too much attention cannot be given to the preparation of land for planting.

SEEDLINGS READY FOR PRICKING OUT

established tobacco-growing areas advantage should be taken of local knowledge as to suitability of varieties. It should be mentioned here that Virginian tobacco is a type of tobacco, not a variety. It embraces those varieties which are used for kiln-drying and constitutes the major portion of the commercial crop. Another type grown, but to a smaller extent, is the White Burley. This comprises a group of varieties with distinct characteristics. This group is more suitable for air-drying.

The chief variety in the flue-cured group is Harrison's Special and less important varieties in the group are Bonanza, Gold Dollar, Cash, White and Yellow Mammoth.

In the Burley Group Judy's Pride, Green Briar, Kelly, and Harrow Velvet are the best known.

Soil, Climate, and Area

Although tobacco plants will grow satisfactorily on a wide range of soils, better-quality tobacco is produced on soils lacking somewhat in organic matter and of poorer nitrogen content, and such soils are preferable to those rich in these materials, so that the supply of nitrogen may be controlled.

The aim of fertiliser supply in the production of high-grade tobacco is to furnish just sufficient available nitrogen to keep the plant growing vigorously up to "topping" time, but no further, so that the plants will be starved of nitrogen while they are maturing and ripening the leaf.

The ideal tobacco land is level, well-drained, sandy soil, with good shelter from wind. Levelness obviates the danger from scouring and loss of soil between the rows in heavy rains, and also prevents the leaching out of the soluble manures to a large extent. Good drainage is necessary, because tobacco cannot thrive in damp, sour soil. A sandy soil is easily reduced to a fine tilth required for tobacco.

Sands and light, sandy loams are more suitable for flue-cured tobacco, while the Burley types do better on soils of higher fertility, such as newly-broken-up old grass paddocks, which are ideal.

The extension of the tobacco-growing industry in New Zealand will be in producing leaf which will be used to replace the high-quality American leaf imported. For this reason the climate, soil, and other conditions should be at least equal to the Motueka district, where good-quality American leaf can be approximated. In the Motueka district there are the desirable sands and sandy loam soils accompanied by high summer temperatures, adequate rainfall, and high humidity, absence of winds, hail and out-of-season frosts. The rainfall required is 35in. a year or more.

Tobacco, with its large, heavy, succulent leaves, is easily damaged by wind storms, but even plants that are not actually broken can be damaged by continually waving about in the wind, as the internal structure of the leaf becomes woody and toughened to withstand the movement. This causes the tobacco to be thicker in the stems and side veins, and such leaf is difficult to cure out a bright yellow colour.

To guard against wind damage, very frequently temporary shelter has to be provided. Maize provides a quick-growing, suitable shelter, and if planted after every fifteenth row will give the necessary protection. It should be planted some weeks before the tobacco is set out.

The area to be worked as an economic unit where kiln-drying is undertaken should be sufficient to provide a full loading of one kiln for one day's harvesting of uniformly-mature leaf from the area of from eight to ten acres. Smaller areas may be worked where arrangements can be made for co-operating with an adjacent grower in the curing of the leaf. There is a limited demand for air-dried leaf, and the area to be worked largely depends on the amount of help available for harvesting operations, shed accommodation, etc. Generally about two to three acres is as much as one man can manage to deal with successfully.

Seeds and Sowing

Only seed gathered from selected plants of approved varieties and strains which have been properly grown for seed production should be used. Seed production should be left to a specialist so that uniformity in type and quality may be maintained. Both of these characteristics are of supreme importance in tobacco stocks.

The seed is very minute, a long .22 empty rifle cartridge holding when filled level with the top about 2,000 seeds.

Tobacco plants may be produced by either raising the seedlings in boxes in glasshouses and later pricking out into seedling beds or by sowing directly into the seedling beds. Pricking out ensures a greater number of good plants of uniform size, but by sowing direct the incidence of mosaic disease in tobacco plants is reduced.

The preparation of seedling boxes is similar to that for tomato seed. Seed should be sown from the first week in August onwards in boxes 18in. by 12in. by 2½in., in which 2in. of sterilised, well-rotted turf soil has been placed. The boxes should be placed in a glasshouse where the conditions give quicker germination. In order to sow seed evenly, a little practice is necessary, and for this purpose one may try shaking seed over a piece of blotting paper the size of a seedling box just damp enough for seed to rest on. Seed may be sown evenly by shaking it off the end of a piece of stiff paper about 8in x 6in., creased at one end to make a shallow trough. By shaking the paper with a quick lateral movement, at the same time moving forward and backward along the length of the box, a good even sowing will result. Seed may then be pressed into the soil with the flat of a board or else lightly covered with clean sand. A .22 long cartridge case filled with seed is sufficient for sowing one box and should yield 1,500 good seedlings. Germination tests carried out previously should enable the rate of sowing required to be varied.

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The temperature of the glasshouse during the day should range up to 80 deg. F., and should not fall below 40 deg. F. at night. In five weeks the plants should be from ¾in. to 1in. high. The number of plants required to plant an acre is 5,000 to 6,000, but additional plants are usually provided for filling gaps. Provision should be made for at least six boxes of seedlings for every acre to be planted.

Pricking Out Seedlings

For glasshouse-raised seedlings, pricking out into nursery beds is necessary. The pricking out improves the lateral root formation and gives the plants more room for development. From mid-September the seedlings should be from ¾in. to 1in. high and ready for pricking out.

For convenience of working it is recommended that nursery beds should be of a standard width of 4ft. with 8in. timber round the borders of the beds. These may be arranged in any convenient lengths adjacent to the field and should run north and south. Thirty-six feet of nursery bed will provide space for 9,000 plants, sufficient for planting an acre with plants to spare for replacements, and will take the contents of six average boxes of seedlings.

Extreme care should be exercised in the preparation of soil for the beds so as to get rid of any fungus harmful to the plants. The soil should be sterilised with steam if possible. In the absence of appliances for steaming, gorse-roots or brush-wood should be piled on the soil and burnt.

The soil should be reduced to a fine tilth before being used for pricking out or sowing, and fertilisers at the rate of ½lb. to 1lb. per square yard of standard tobacco fertiliser (3:8:8) mixture should then be added and thoroughly mixed with the soil. The lower rate of application of fertilisers should be sufficient for sterilised soil. The beds should be raised to a height of 5in. or 6in. above ground-level, with prepared soil and the soil graded over very carefully until the surface is level and smooth. To avert the danger of late frosts and cold snaps, suitable calico covers should be provided to protect the plants. Covers should be kept clear of plants, and for this purpose they are best made tent-shaped by pulling them tightly over a single wire stretched down the centre of the bed.

A planting-board is necessary to ensure the work being done quickly and neatly. The specifications for a suitable board are as follows:—Timber, matai heartwood; length, 3ft. 9in.; thickness, ¾in.; width, 4in. On one edge of the board make a 2in. double bevel. Make some suitable marks 1½in. apart on one side of the board to mark positions for planting in the soil when the board is inserted in the ground.

With the planting-board, open a small trench across the bed, and in it place the seedlings 1½in. apart, carefully covering the roots. The opening of the next trench, 1½in. distant, completes the closing of the trench already planted. In about five days the plants should have begun to establish themselves in the soil, and should be showing indications of further growth. The plants usually grow quickly and should be ready for planting out in the field by the beginning of November.

Bed-sown Seedlings

The alternative method of raising plants is to sow directly into seedling beds as previously mentioned. The preparation of the beds is the same as for pricking out seedlings. Sowing requires extreme care to obtain evenness, and as the seed is very fine it requires mixing with fine, dry sand at the rate of a level teaspoonful of seed to a quarter benzine tin of sand. This amount will provide sufficient plants for one acre and should be sown over 100 sq. ft. of seedling bed. To obtain an even sowing the beds should be gone over with a very light sowing several times. After sowing the seed should be covered lightly with dry sand.

Preparation of Land

Too much attention cannot be given to the preparation of the land for tobacco culture. The more thorough the cultivation the better the crop is likely to be; poorly-prepared land seldom yields good crops.

In the late autumn or early winter the land should be ploughed deeply to cover all herbage completely. The burying of all grass and weeds is important, as by this means the food of caterpillars, which are a serious and destructive pest of tobacco plants, is destroyed. The deep winter ploughing assists in the improvement of the drainage on the stiffer soils, improves the texture of the soil, and makes it more congenial for the roots of the plant. It also assists in the conservation of moisture during dry spells in the growing period.

The land should be reploughed in the early spring, but not so deep on this occasion as to bring up the sod turned under at the winter ploughing. The land should be worked regularly —say, every fortnight—after the spring ploughing until the time of planting at the beginning of November. It is important, too, that it should be cultivated after rains. Thorough working with disc and harrows is essential for reducing the land to a fine tilth.

Immediately before transplanting is to begin, the land should be levelled

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and smoothed with a plank drag. It is not advisable to use a roller on heavy land, as this consolidates the ground too much.

It is particularly important in preparing land used for tobacco in the previous season to plough in the old stalks early to allow for complete decomposition.

Manures and Fertilisers

Too rich a soil, and soils which have been too richly manured, cause the tobacco plants to grow rank and wild. Such plants will produce a dark, poor-quality leaf. The presence of readily-soluble plant food applied in the field causes the young plants to start away quickly and to make good, vigorous growth, while the slower-acting manures are becoming available. In order to obtain suitable growth, it is important that the proper combination of fertilisers be added to the soil.

The fertiliser mixture generally used for tobacco is a standard mixture containing nitrogen, phosphoric acid, and potassium in the percentages of 3:8:8, and is known as the standard 3:8:8 mixture. The mixture consists of the following fertiliser ingredients to the thousand lb.:—

	lb.
Nitrate of soda	69
Sulphate of ammonia ..	47½
Dried blood	77½
Superphosphate	400
Sulphate of potash	161
Dolomite	80

The rate of application should be varied according to fertility of the soil and the type of tobacco grown.

Recommendations for quantities to apply are:—

Flue-cured.—Standard mixture at the rate of 800 to 1,200lb. per acre. On heavier types of soil nitrogen should be reduced by one-third and on lighter soils increased by one-third.

Air-dried.—Because of the higher fertility of the soil generally used for this type of leaf, 500 to 800lb. per acre are sufficient. Nitrogen in the mixture may also be increased by one-third.

Fertiliser may be applied by a special drill placing it 5in or 6in. deep where the rows come. Half the quantity should be used as a pre-dressing before planting and the balance scattered along the row by hand after the plants are established.

Control of Pests and Diseases

Four or five days before planting, poison should be laid for cut-worms and surface caterpillars. The best time of the day to lay the poison is about 4 p.m. The following is a good poison-bait recipe:—

1lb. Paris green.
1 bushel bran.

Mix these two ingredients thoroughly and moisten with water sweetened with molasses until crumbly. Alternatively the bran and Paris green can be used dry. Arsenate of lead, 2lb., may be used instead of Paris green.

This material should be broadcast at the rate of 1 bushel per acre. One application is usually sufficient. Rain spoils the poison, and when rain falls before the poison has had an opportunity of being effective it should be resown. The poisoned bran should be sown with the assistance of the wind, the bran being thrown in the air so that the wind may scatter it more or less evenly over the surface of the ground. The first night probably as many as 75 per cent. of the caterpillars will be poisoned.

Wood-lice are troublesome in seed boxes; apply flaked naphthalene. Black caterpillars are troublesome at planting; lay poisoned bran prior to planting, as above. Green caterpillars, wire-worm, and leaf-miners are troublesome later in season; pick off caterpillars when observed and destroy by burning.

As regards fungus diseases, damping-off is troublesome during the seedling stage, leaf-spot during the growing period, and mould during the curing period of air-dried leaf.

MOSAIC.

Mosaic is a virus disease well known in New Zealand and is recognised by the effect on the leaf. Tobacco mosaic may assume any one of three forms—a light-green and dark-green mottle, a mottle together with necrosis (that is, the leaf tissue killed in spots), or a blistering of the leaf blade sometimes with and sometimes without mottling. The leaf itself may be smaller than on a healthy plant, but as a rule it retains its symmetrical shape. When mosaic occurs up to a month after transplanting considerable loss in yield will result. If the disease does not occur until topping time no significant reduction in yield is noticeable, but in both instances the quality of the leaf is inferior, resulting in a drop in value.

Recommendations for control are summarised as follows:—

1. Use a new site for the seed-bed or steam-sterilise the soil in the old beds. Never use tobacco trash as fertiliser for seed-beds.

2. Boil old seed-bed covers and spray all boards, etc., with a 2 per cent. formalin solution. Keep down weeds round the plant beds.

3. Use well-cleaned seed.

4. Wash the hands thoroughly with soap and running water before doing any work about the plant-beds.

5. Do not smoke while working on the beds or during transplanting.

6. Rotate tobacco with some other crop.

7. Where the infection is light, rogue out all infected plants.

8. Implements which have been used in a badly-infected field should not be taken to a clean field until they have been washed and disinfected.

9. In topping, suckering, etc., do all the healthy plants first, leaving the mosaic plants until later.

Planting

The rows of plants should run north and south, and are set 3ft. 6in. to 4ft. apart to allow sufficient room for working the soil and for harvesting operations. A satisfactory distance for spacing plants in the row is 20in. to 24in. On this basis, 5,000 to 6,000 plants are planted to the acre. Any variation in these distances should be made only with a knowledge of what suits the particular area being worked. The position for the plants is marked by the fertiliser drill one way. This gives the position of the rows, which are then marked across with a drag fitted with pegs spaced at the interval in the row decided on.

Planting is done with a trowel, placing the plant slightly deeper than in the bed and firming well round the roots. Sufficient plants should be available for replacements, and if the filling of gaps is attended to early greater uniformity in the crops is secured.

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FIELD OF TOBACCO PLANTS: KILNS IN BACKGROUND.

COMMERCIAL tobacco growing has been so successful in the Nelson district that it has become a major horticultural industry. About Motueka, where the industry is centred, climate and soil are so favourable that a good-quality leaf can be produced.

A "HAND" OF TOBACCO.

PASSING AND TYING LEAF FOR KILN TREATMENT.

Summer Treatment

Cultivation should start as soon as planting is completed. Thorough working at this stage will save much weeding later. Cultivating tools used should be designed to throw the soil towards the plant to give a slight moulding. The first cultivation should be deep, while subsequent ones should be shallow and carried out at frequent intervals until the spread of the leaf is such that damage would result. Hand-hoeing between the plants is just as essential as the inter-row cultivation. Two or three such hoeings will be found necessary during the growing season.

Topping, Priming and Suckering

For the general improvement of the tobacco crop and the grade of leaf produced, certain pruning practices are necessary which tend to direct the energies of the plant into leaf development. The operations entailed consist of "topping," "priming," and "suckering."

The topping of plants consists of breaking out the top when the first flowers start to open. This has the effect of directing the energy of the plant into the already-formed leaves and increasing their size and quality. In **flue-cured** varieties this is done at an average height of 15 leaves. In a poorer growing crop the number of leaves left might be only 12 or less, but in more fertile soil with a strongly-growing crop topping may be higher. For **air-dried** an average of 12 leaves will be a reasonable height.

Priming consists of removing the two or three lower leaves which are subject to damage and which are usually of little value. The operation of breaking off these lower leaves should be carried out before topping.

Lateral growths develop about 10 days after topping, and should be removed when about 3in. long. Suckering will require attention about every 10 days until the leaf is gathered.

Harvesting and Curing

The method of harvesting tobacco leaf for flue-curing is to gather the leaves, when ripe, from the bottom upwards, usually picking two or three leaves at one picking. Ripeness is denoted by a yellowish sheen displacing the original dark green of the growing period. Some of the lower leaves through damage and dirt may be of little use except for insecticidal purposes.

Pickers may pick from two rows of plants. The leaves taken at each picking should be as even as possible in respect to colour and maturity. The following points should be observed:—

Do not pick unripe leaf for the sake of filling the kiln.

Do not crush the leaves, as every bruise means a brown discolouration and lowering of grade.

Do not spread picking for a kiln load for more than a day's picking, as wilted leaf will not wait for green leaf to colour, but will turn brown before the fresh leaf loses its green.

All hands should be put into the field and the picking done as quickly as possible. The hot sun should not be allowed to blaze on picked leaf. Leaf is gathered in armfuls and placed in bins conveniently placed for pickers, who carry them down the rows as they proceed with the work. The bins are constructed with a wooden framework 6ft. long, 2ft. wide, and 18in. deep, covered with hessian or sacking. The bottom battens extend beyond the ends to form handles. When the bins are filled they are conveyed to the kiln site for the tying of leaf on to sticks ready for loading the kiln. It is preferable to carry out tying operations in the shade, both for the comfort of the operators and for the protection of the leaf.

Curing sticks on which the leaf is tied are 4ft. 3in. long and are supported on a trestle during the tying operation. The laden sticks are carried into the kiln and hung on tier poles for the curing process about 8in. apart, loading the top tiers first. The bottom tier should be 7ft. from the ground. Uniformity in picking means uniform results and high values. Faults in picking cannot be remedied in the kiln. Not more than 35-40 bundles of leaf should be tied to a 4ft. 3in. stick—bunches consisting of two large leaves, three medium, or four small leaves.

Drying kilns, preferably of a standard dimension of 16ft. by 16ft. by 20ft. to the eaves, should be perfectly airtight and built of good insulating materials. If heat can escape through the walls the leaves nearest the walls will be cooler than those nearer the centre, the effect being that the centre colours quicker than nearer the wall; consequently green leaf will be found near the walls and corners when the leaf in the centre of the kiln is well coloured.

When moisture is found on the walls of the kiln while leaves and woodwork in the centre are dry, it indicates that the walls are cooler than the centre. A kiln like this is likely to produce green leaf near the walls and corners with only the centre leaf colouring.

For an air-dried crop the grower should take the four middle leaves of the plant as a guide for the correct stage of maturity for harvesting. They should be taking on a mottled appearance, the mottlings being about the size of a threepenny-piece. The texture of the leaves should be thick and dense on feeling; they should be crisp and break when bent. The bottom leaves will then be fully ripe. Burley being grown mainly for air-drying is harvested by cutting whole plants at or near the ground level when the dew has dried off them, and the plants are tied in pairs for hanging in the drying shed. The green leaves should be handled with great care, as they are very easily broken or damaged, with consequent loss of value. Bruised leaf will not cure; sticks are used for hanging the leaf, and are usually 4ft. 3in. long, eight pairs of plants being hung on a stick.

Another system of harvesting is to split the stalk with a sharp knife to within several inches of the ground and cut it off. The split stems are then hung over the sticks. When this method is used the plants are placed closer together on the sticks as compared with plants tied in pairs.

The plants should not be left lying in the sun, but should be hung over the curing sticks and carried into the barn as soon after harvesting as possible. The leaf is cured in sheds which can be well ventilated. It is usual to have doors at both ends and adjustable ventilators along the length of the shed from ground to eaves. Air-dried leaf is liable to develop mould in damp weather, and to offset this good ventilation must be provided, but at times it is necessary to use coke braziers.

The warning indication of mould is a sour, dank smell. It develops and spreads quickly on the leaves when conditions are suitable.

In curing Burley, the leaf at first turns yellow, and then brown, as chemical and bacterial changes take place in it. The leaves should remain on the stalks until the midrib of the leaves is brown. To test whether the moisture has evaporated sufficiently to permit the butts of the leaves to be tied together for a considerable time without decay developing, screw the ribs with the fingers. For yellowing, leaves should be hung close and ventilators closed. When yellowing is far enough advanced, open up and ventilate thoroughly.

Cured leaves should not be handled while they are dry and brittle, otherwise they will break up and be a total loss. In a humid atmosphere the dry leaves reabsorb moisture, and when sufficiently pliable they may be handled carefully without damage.

When ready, the leaves are removed from the stalks, graded, and tied in "hands" as described as under grading. The hands may be rehung in the barn, and must be kept dry and reasonably warm to avoid the development of mould.

Kiln Curing

In kiln curing the process may be divided into four stages:—

1. **Yellowing,** in which the leaf remains alive and starches are changed to sugars;

2. **Fixing colour**, in which the leaf is killed;

3. **Drying the blade;**

4. **Drying the midrib.**

Yellowing is secured by a low heat with high humidity. The vents are all closed and an approximate temperature of 90 degrees F. maintained. The yellowing process will take approximately 24 hours at the beginning of the season and may take up to 72 hours late in the season when outside temperatures are low and leaf is not ripening.

Although a temperature of 90 degrees Fahrenheit is the usual heat used, this is one of the changing features left to the judgment of the operator. It will be readily recognised that if the outside temperature is 95 degrees it would have a cooling effect to have only 90 degrees inside; in such circumstances 100 degrees would be a better starting temperature.

In New Zealand the main tobacco harvesting usually commences in late January, with an average summer temperature of 80 degrees outside, and yellowing is developed at 90 degrees. Later in the season, during the latter end of March when the weather is cooler, yellowing would commence at 80 degrees. Always keep the heat 4 degrees or 5 degrees higher in the kiln than outside when commencing. Do not retard the process by putting leaf into a cooler atmosphere than that to which it has been accustomed outside.

The fixing process is achieved by bringing the temperature up to 120 degrees, raising it gradually at the rate of 2 degrees to 3 degrees per hour, and giving sufficient ventilation to keep the kiln free of moisture. The process is complete when the tips of leaf on the two lower racks begin to curl up. This process covers a period of approximately 12 hours.

In drying the blade all vents are opened to provide the maximum ventilation and to raise the temperature by 5 degrees per hour up to 135 degrees to 140 degrees, this temperature being retained for 46 hours or more.

In drying the midrib ventilation is reduced to a quarter; raise the temperature by 5 degrees per hour to 170 degrees or 175 degrees, but not over 180 degrees. These conditions are maintained for 24 hours. Experience will show which is the last part of the kiln to dry, and this should be examined for fat midribs.

Conditioning the Leaf

After all possible care has been taken to grow and cure the crop, loss can occur in bulking. Tobacco should feel like an old bank-note—pliable but not damp—before any attempt is made to move it. Bulks should be built in the grading shed, where they should remain for about a month before grading and making into "hands." This brings about a mellowing of the colours. Any slight greenness near the side veins will become lemon-coloured, and various shades of yellow will all become one.

Grading

The principles applying to grading both air-dried and kiln-cured leaf are the same. It is necessary, of course, with air-dried tobacco first to strip leaves carefully from the stalks when they have been cured and have become sufficiently pliable to handle. Leaf should be graded according to specified grades and tied in hands of from 15 to 20 leaves according to the thickness of the midribs. The tie is made with a leaf of the same colour and grade as that going into the hand, and should not cover more than 1½in. of the butts and be as close to the ends as possible—three turns and a tuck, with upper side of the leaf outwards.

In grading tobacco, leaves fall into four main divisions known as "lugs," "cutters," "leaf," and "tips." These are kept separate and are further subdivided according to size, colour, and soundness of leaf.

1. **Lugs** are the lowest leaves on the stem. They are generally damaged, small, brittle, harsh, and dry.

2. **Cutters** are next on the stem, are the best leaves on the plant, being wide, large, and of fine texture and thin body.

3. **Leaf** are those next above the cutters, and are narrower, heavier bodied, and not so fine in texture.

4. **Tips** consist of the small, narrow leaves from the top portion of the plant.

The main point to watch in grading is to see that all leaves within one grade are uniform. In grading Burley fewer grades are made because of the nature of the leaf.

Grading should always be done with a light from windows in the south at the back of the grader. Direct sunlight, with its varying brightness, causes yellow tobacco to appear many shades brighter or duller than it really is and should always be avoided. Electric light always intensifies any greenish colours and gives a false value to yellows.

Acknowledgments.—Thanks are extended to the Cawthron Institute, Nelson, for permission to use photographs by Mr. W. C. Davies, Hon. F.R.P.S., Curator to the Institute, and also to the Director of the Tobacco Research Station, Umukuri, Nelson, for helpful criticism.

References.—Miscellaneous reports of the Cawthron Institute, Nelson, and the Tobacco Research Station, Umukuri.

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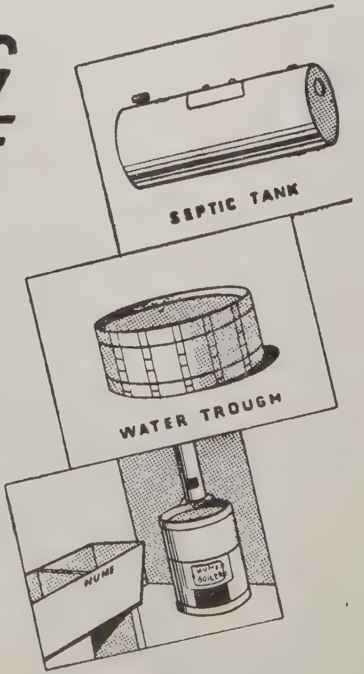

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WINTERING OF PIGS

By E. H. ARNOLD, *Instructor in Agriculture, Whangarei.*

PIG-KEEPING was formerly mainly a question of fitting in the breeding with the skim-milk supplies; pigs were raised to be plentiful when seasonal skim-milk supplies were available; only breeding stock were kept during the winter, and much wastage of both skim-milk and young pigs occurred. During the past 12 to 15 years, however, advances in feeding and management practices have enabled radical changes to be effected in pig-keeping economy, and success no longer depends on reducing the number of pigs carried over the winter to a minimum.

USUALLY first-litter pigs from sows farrowing from July to September were sold as baconers from January to March. The second litters, if there were any, and if they farrowed early enough, were sold as porkers in the late autumn. Many light stores and weaners from the later and autumn farrowings were sold to specialised pig-keepers for wintering, or were allowed to fend for themselves as best they could.

Supplements—Earlier Farrowing

With the aid of small quantities of purchased meals or grains, earlier farrowing of sows in May-June was then adopted. The first-litter pigs were disposed of as baconers in December-January. From the second farrowing in November-December porkers or light baconers were sold in May.

A study of farm results obtained from the pig census returns showed that when pollard, barley, or other grain meals costing from £6 to £9 per ton were used, the greater the amount that was used up to 5cwt. per cow milked the greater was the profit. When meals cost £14 per ton the upper economical limit was reached apparently when 1cwt. of meal was used per cow milked, i.e., 1lb. of grain to 5 gallons of milk.

Increasing use began to be made of meatmeal to supplement skim-milk, particularly for sows with litters, when supplies of milk decreased.

Evidence, backed by results of trials at the Ruakura Animal Research Station and the Demonstration Farms at Dargaville and Waimate West, then became available from certain farms to show that small quantities of meatmeal fed along with farm-grown crops such as roots, pumpkins, and maize would provide suitable rations for wintering both breeding and store pigs in a thriving condition. Thus it was found profitable to carry over the autumn litters and send them off in the spring as baconers.

The pig census returns also showed that those farmers who carried many pigs through the winter used as pig feed about 2 acres of roots and grazing as well as 3 tons of meal for every 40 cows milked, and obtained a return of 52/- per cow after paying for the extra feed. Further, those farmers who carried few pigs through the winter used as pig feed 1/10th of an acre of roots or grazing and less than one ton of meal; and obtained a return of 34/- per cow after paying for the extra feed used.

When war conditions demanded the maximum production of baconers, pigs from the November-December farrowings, usually of pork or light bacon weight in the late autumn, had to be finished off to baconer weight with meals and suitable farm-grown crops, and stores from the January-March farrowings had to be carried as winter stores on farm-grown crops and some meal, to be finished off on skim-milk in the spring as baconers for disposal in October and November.

Cropping is the foundation of success in wintering pigs. While adequate provision of farm-grown feed, along with minimum use of meals, especially meatmeal, enabled a good output of bacon, enhanced profits were also realised. Today, the Pig Crop Subsidy makes it still more profitable to winter pigs. In addition, the use of farm-grown crops ensures that the best use possible is made of the skim-milk supply during the following summer.

Winter Feeds Available

During the winter, approximately from May to September, when dairy by-products are at a minimum, practically all feed available consists of roots and grass supplemented by a limited amount of meatmeal and other grains. Quite a variety of crops, depending upon the conditions on the particular farm concerned, are available, including among the roots: sugar beet, carrots, mangolds, swedes, and artichokes; grain crops: maize, barley, and peas; greenfeed crops: chou moellier and silver beet; and pumpkin family crops: pumpkins and kumi kumi.

The sugar beet crop is probably best for pig feeding; it can be left in the ground until required; both leaves and roots can be fed directly after pulling; it is relished by pigs, and, apart from its suitability for store pigs, it can make up one-third of a fattening ration. It thus proves very helpful in finishing off light baconers in the autumn.

Carrots are readily eaten by pigs, and can be left in the field until required.

Mangolds, although a much more bulky food than sugar beet, when pitted or clamped keep well into the spring. They require storing for at least six weeks in the clamp before use.

Swedes, a bulky feed, are less relished by pigs, but have proved useful for maintaining pigs in a winter store condition.

Artichokes, although lower yielding and rather low in nutrients, have an advantage in that the pigs can be turned in to do the harvesting.

Maize, valuable in the warmer districts, is a more concentrated food; it can be fed on the cob and may be stored until required. It thus has an advantage over roots, which have a limited keeping period.

Pumpkins are keenly relished, the pigs eating the seeds as well as the flesh.

Kumi kumis possess less nutrients than pumpkins.

Peas are more of a protein-rich concentrate. They do not require threshing, which can be performed by the pigs.

All the above-mentioned crops, except peas, are low in proteins and certain minerals. The deficiencies can be made up to a certain extent by grazing the pigs on short, leafy pasture, but meatmeal is by far the best protein-rich supplement, and to a lesser extent with peas or peameal a little less valuable in this respect.

Feeding the Pigs

Sows. Research into sow nutrition reveals that to produce more and larger piglets per litter sows require liberal feeding for the six weeks after weaning to enable them to regain lost condition; then moderate feeding to hold their condition until six weeks before farrowing, when they require increased food to build up the developing litter and put themselves into rising condition for farrowing and suckling of the litter. Generous feeding is also necessary following farrowing.

In the winter, when skim-milk supplies are deficient, pasture growth, so often the only feed for in-pig sows, is not sufficient. A pregnant sow requires at least 1½lb. of meatmeal or 2 to 3lb. of other grains, plus up to 30lb. of roots daily, dependent upon the pasturage provided.

Sows with litters require eight units of feed daily, increased by one unit each week until the sow and litter receive six units for the sow and one unit for each piglet; the latter are three weeks being fed in a creep. Equivalents of one unit of standard feed are: 1lb. of good meal, maize, barley, peas, or wheat; 1 gallon of skim-milk or two gallons of whey; 10lb. of roots such as mangolds and swedes, kumi kumi, or grass; 8lb. of carrots or pumpkins; and 6lb. of sugar beet.

The greater the proportion of skim-milk, meals, and grains provided for sows, the better will be the results. This is particularly necessary after farrowing, owing to the greater quantity of food then required.

Boars. The boar is often a rather neglected animal, especially during the winter, when he is often confined to an area of poor pasture, soon to become bare of grass, and there allowed to shift for himself. The boar should be maintained in the equivalent of good forward store condition, which requires the supply of from four to eight feed units daily. Good pasturage may supply a fair portion of this, but other feeds are necessary, such as ¾ to 1lb. of meatmeal plus roots to appetite.

Stores. Store pigs require a winter ration of feed to maintain a thriving condition—to make an average increase of half a pound liveweight per pig per day over the period from May to late August. To do this a daily ration similar to any of the following three is necessary for a 70lb. store pig:—

1. ½lb. of meatmeal and roots or pumpkins, etc., to appetite.
2. ½lb. of meatmeal, 10lb. of roots, plus 1½lb. of maize.
3. ½lb. of meatmeal, plus 2½lb. of maize.

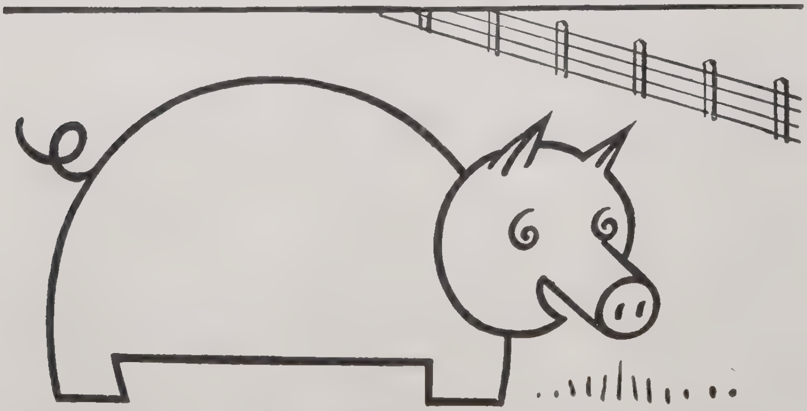
For stores of a lighter weight slightly less is required, and as they increase in weight slightly more should be fed. The meatmeal can remain constant throughout, while the pigs should be brought on to the roots gradually as other feed supplies decline.

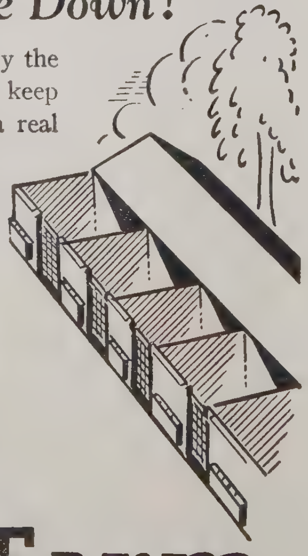
Stores should be provided with comfortable houses and allowed access to short, leafy grass whenever weather and soil conditions permit. A store pig of 50lb. liveweight at the end of May and 100lb. in August will consume approximately ½cwt. of meatmeal plus 15cwt. of roots or 2½ bushels of maize. If any skim-milk is available above the requirements of the sows, it can replace part of the meal or grain portion of the store pigs' rations.

Finishing off Lightweights: In late autumn or early winter it is often rather difficult to finish off lightweight pigs to heavier weights, unless crops such as maize and sugar beet are available. For a fattening or a finishing ration too much bulky feed is undesirable, and the feed should be comprised of at least half skim-milk, meals, or grain. Maize is therefore very useful, while sugar beet is the best root crop for feeding in such a ration.

General

The provision of good housing and the maintenance of hygienic conditions are important in wintering pigs of all ages. Poorly-built, badly-ventilated, or draughty houses, overcrowding of the pigs, and muddy, waterlogged yards detract from the successful wintering of pigs.





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Cleaning Up The Home Garden

By D. K. PRITCHARD, *Instructor in Vegetable Culture, Wellington.*

WITH the exception of a little attention to unharvested root crops and late-maturing green crops, intensive gardening operations for the season are now practically over, and the time has arrived for a general clean up of the area where the already-harvested crops were grown.

FULLY-MATURED tomatoes should be picked and the vines dug out and burnt; it is not advisable to pull them out. Soil adhering to the roots should not be shaken off, as burning them with the plants is a positive method of destroying injurious fungi which may have infested the roots of some of the plants. If tomato vines which have not died down thoroughly are hung on top of the stakes to dry they will be more easily destroyed. Later, the stakes should also be removed, tied in a bundle, and stored so that they can be used again.

Clean, disease-free plant residues may either be collected and placed in the compost heap or dug into the garden. Unless the heap is so constructed that sufficient heat will be generated to kill injurious fungi, diseased garden refuse should be burned.

If heavy soil on which a green manure crop is growing is now dug over and left in ridges, less labour will be necessary when preparations are being made for spring sowing and planting. Before digging is started live hedges around the garden area should be trimmed, and, where the trimmings are green and succulent, they may be either dug in or composted. With hedges trimmed, digging can be carried out close to the roots, thus giving the garden a much tidier appearance.

Light soils and those which may be deficient in organic matter will be greatly benefited if they are allowed to carry a green manure crop through the winter.

Storage

All pumpkins, squash, and vegetable marrows which remain unharvested should be brought under cover without delay. These vegetables are frost-tender, and are rendered unfit for human consumption when exposed to even a few degrees of frost. Provided they are not placed on the ground, all the above gourds can be conveniently and successfully stored under trees. To keep well in storage, gourds must be fully matured. This stage is reached when most of the foliage has died down and the skin of the fruit has hardened so that it cannot be penetrated by pressure of the thumb-nail. The skin should also have a hard, glossy appearance. Good results may be secured by placing the selected specimens on straw-covered shelves in a well-ventilated shed where very cold conditions will not be experienced.

Where specimens of Triamble and Queensland Blue pumpkins, vegetable marrows, and Hubbard squash have been stored, and provided all are well matured and have been properly harvested, the pumpkins should be used last. Experience has demonstrated that, under good conditions, the above varieties of pumpkins will keep best during storage. Only the sound, undamaged specimens should be selected for storage.

Carrots

Under ordinary soil and weather conditions carrots will keep well if allowed to remain undug, provided they are not affected with disease or damaged by soil pests. Superficial damage gives an opportunity for secondary infection by fungi or bacteria, which may be destructive to the roots in the soil. Under these conditions it is advisable to remove the crop and store the sound roots. In areas where heavy frosts occur it is better to dig carrots before they are frozen into the ground.

Parsnips

The foregoing advice about carrots is generally applicable to parsnips, both kinds keeping well in storage if moisture is not permitted to dry out of the roots.

Asparagus

As soon as the top growth which should have developed since harvesting ceased begins to change colour from green to brown it should be cut to about 2in. from ground level, removed from the bed, burnt, and the ashes broadcast over the crowns. This will provide a small quantity of potash, which is a very beneficial fertiliser for asparagus.

If previous recommendations about manuring of the plants immediately cutting of spears was finished have not yet been carried out, the following manurial treatment should be given:—A good handful of blood and bone manure to each crown, together with as much wood ashes, soot, and compost as can be spared, should be broadcast over the bed and lightly worked into the top soil. For long and profitable life of asparagus roots heavy manuring is necessary.

Rhubarb

When clearing away the decayed residues of late rhubarb growth, and before turning over the soil of the area occupied by the roots, manure

[*Sparrow Industrial Pictures photo.*

Ashes broadcast over the soil provide potash, a beneficial fertiliser, especially for asparagus.

should be applied to those roots which it is intended to retain for next season's production.

Rhubarb roots will tolerate very heavy manuring, and, for the maintenance of desirable soil conditions, a heavy dressing of well-rotted stable manure is specially recommended. On light soils well-rotted cow manure is considered very suitable, while dry fowl manure is also good. In addition to these animal manures, an application of blood and bone manure, two handfuls to each crown, should be broadcast over the bed and lightly forked in. Shallow forking is advisable, as damage during cultivation to feeding roots near the surface would restrict the crowns in the full utilisation of the fertiliser supplied.

Leeks

Leeks are a valuable winter and early spring vegetable; as they are hardy and will successfully withstand severe frosts without injury, they should not be neglected. The plants should be kept clear of weeds and, particularly on light soils, where growth has not been good, an application of dry fowl manure which has been mixed with 10 per cent. of its weight of superphosphate will assist growth. Fowl manure should be worked into the soil immediately after it is applied.

Celery

Celery plants should be sprayed with Bordeaux mixture (3-4-50) every 10 to 12 days to preserve them for winter use and to protect them from attack by the fungus responsible for late blight. Trench-grown celery does not require to be blanched artificially. Plants grown in surface rows may be blanched by drawing the soil to the stalks. To prevent soil entering the heart of the plant when hoeing is being done outside stalks may be tied loosely together near the top of the plant. Blanching can also be done by fastening paper—waterproof paper is preferable—round the plant. The paper should not be placed hard down on the soil, as this would prevent proper circulation of air.

[Sparrow Industrial Pictures photo.

Fowl manure is a source of nitrogen. It may be applied dry to the soil round rhubarb roots.

Cabbage (Spring)

Young spring cabbage plants should receive favoured treatment before severe weather sets in so that they may make maximum growth to withstand extreme cold. Forcing the plants with overdoses of nitrogen should be avoided, as this would result in a weakened constitution, which would prevent the crop from reaching maturity in profitable condition. While the application of liquid manure is beneficial, and may even be necessary, it should be used with discretion. If nitrate of soda is used for liquid manure, the strength should never exceed 1oz. to 4 gallons water.

Swedes

Once thoroughly established, a crop of swede turnips requires little attention beyond keeping the bed clear of weeds. As it is still possible for the top growth to be infested with aphis, which may seriously restrict full development of the roots, spraying with nicotine sulphate or dusting with derris should not be neglected.

Don'ts

DON'T neglect the compost heap during winter. It should be protected against heavy, soaking rain.

DON'T overlook the provision of proper drainage conditions for winter-growing vegetable crops.

DON'T be indifferent to crops in storage; they should be examined frequently.

DON'T leave undug any part of the garden from which a crop has been harvested. It should either be thrown up in ridges or sown with seed for a green manure crop.

Silver Beet

Plants of silver beet which may have been set out during late February or early March should now be making good growth, and in areas where heavy rainfall is usual during winter and early spring good drainage conditions should be assured. Cold, wet soil is not conducive to normal growth, and no amount of manure or artificial fertiliser can make amends for bad or indifferent drainage.

◆

Practical advice and sound information on how to get assured vegetable results are contained in "Vegetable Growing in the Home Garden," by D. K. Pritchard, which is available at 6d. a copy (post free) from offices of the Department of Agriculture.

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EROSION CONTROL on EAST COAST HILLS

Trees Used Successfully on Sheep Stations

By V. P. BOOT, *Fields Instructor, Gisborne.*

THE serious consequences of unchecked erosion in practically every country in the world have been emphasised during the last decade in agricultural writings, moving pictures, and newspapers. When we realise that every individual on the earth's surface requires at least two acres of land per annum to meet his or her food requirements, the importance of soil conservation should be apparent.

IT is useless to say that what has happened could have been prevented, if the peoples of the world had not destroyed Nature's protective covering of the earth's surface. The damage has been done and is continuing, and it behoves every individual to play a part, no matter how great or small, in the protection of our valued heritage, the land.

Overwhelming losses of fertile land in other parts of the world have brought to New Zealanders the realisation that they themselves are faced with a serious national problem. In many parts of New Zealand catchment boards have been set up under the parent body, the Soil Erosion and Rivers Control Council. While many people read of the activities of the council and of catchment boards, as individuals they are not particularly interested in the problems confronting the farmer whose land is endangered by erosion. The success of these catchment boards can be attained only if people realise that their problems and the problems of the individual farmer are of paramount importance to every person in the country.

Now that New Zealanders are becoming erosion-minded, and are facing up to the problems involved, each landholder should ask himself: "Am I, as an individual farmer, contributing to the loss of valuable soil; and if so, what can I do to arrest this development?" While it is fully realised that there are many instances where erosion is so serious that it is beyond the efforts of the individual farmer, the fact remains that a tremendous amount can be done by tree planting, introduction of more suitable pasture grasses, improvement in management methods and control of rivers and creeks on individual farms. Any in-

PREVENTION OF SLUMPING ALONG CREEK BANKS

Upper—
Planting of one of the creeks in area A.

Below—
Planting near stockyards (in background) on area C has stabilised the land and saved the yards.

dividual effort which can be harnessed to the task will assist materially the work of the catchments boards. Unquestionably, individual effort, if carried out in sufficient time, can not only arrest erosion, but also cause complete stabilisation of the land.

Early Realisation

In Poverty Bay there are several farmers who, fortunately, realised many years ago that unless erosion problems were combated, they would be faced with serious loss of valuable grazing land. Among the farmers noted for their work in this direction are Mr. A. B. Williams, Puketiti Station, Te Puia Springs, East Coast; Mr. G. M. Newman, Waipaoa, Waikohu County; and Mr. P. W. Barrett, Mangaoporo River, Ruatoria.

While the work of Mr. A. B. Williams is described in this article, the intention is to publish from time to time the work and experience of other men engaged on this extremely useful work.

Some 43 years ago, Mr. Williams realised that the denudation of forests and overstocking with sheep had been instrumental in increasing dangerously the normal run-off of rain water into the creeks on his property, the result being that whenever heavy rains fell the unchecked flow of water into the creeks turned quite small streams into raging torrents which scoured away the toe of the land along the creek beds and gradually caused serious slumping of the surrounding country.

In some areas the slumping became so severe that it was not possible to ride a horse in the vicinity of some of the creek beds and many acres on the station were out of production because they could not be grazed.

Mr. Williams farms a hill-country station of 6,500 acres; the homestead is sited at the foot of the 1,700ft. Puketiti Hill. The country varies from easy rolling land to steep faces, and averages from 1,000 to 1,200ft. above sea level. About 60 acres are still in native bush, while 130 acres of utility plantations have been planted over the last 40 years. The average rainfall for the station is 70in., the minimum 56in., and the maximum 130in.

When Mr. Williams first realised the serious erosion threat to his property, he was carrying 8,000 sheep and 600 cattle. Today there is a marked difference in the stocking, nearly one-third fewer sheep and more than twice as many cattle, namely 5,700 sheep and 1,400 cattle.

Two factors have assisted materially in the war Mr. Williams has waged against erosion—careful and persistent planting of suitable trees and a balance in the stock carried on the property—the latter resulting in an improvement in the pasture.

The most distressing feature of the erosion on this and many other properties in the Poverty Bay-East Coast districts is that it is the fertile papa and mudstone soils which show a marked tendency to erode and slump. This is particularly the case where rivers, creeks, and streams are uncontrolled and the surrounding land is denuded of trees while the pasture has insufficient grasses and clovers in it to prevent rapid surface run-off. During periods of heavy rains, water rushes unchecked over pasture land and the flood waters course unimpeded down stream beds. What is the result?—Erosion! The toe of the slope which holds up the land bordering the creek beds is gradually eaten away, the land slowly slumps and breaks away up the slope, then cracks appear. Surface run-off water finds these cracks, the land slowly but surely becomes water-logged, and when the burden of water becomes too great, large tracts of land slump and slip down into the creeks to be carried away in the flood waters.

Control of Creeks

Mr. Williams realised it would be futile in such cases to rely only on tree planting and an adjustment in his stocking and grazing. In order to stabilise his land, he needed to control the creeks as well. This he did by methods described later. Each problem was studied on its merits and the method of control varied appreciably in the different types of erosion.

VARIOUS METHODS OF COMBATING EROSION

(a) Arresting slumping of hill slopes by tree planting on an extensively-eroded area (B on map).

In 1902, Mr. Williams started to plant the most severely eroding area on his property—the Pauariki stock track alongside which runs the Pauariki stream. The area had slumped so badly that not only was it unsafe for grazing, but also after heavy rain it was not possible to ride over any part of it. Realising that a great number of trees would be required to stabilise the area, Mr. Williams considered it more economical to fence off the area completely rather than protect each tree individually. In any case during the year it was often impossible to graze stock there.

Willows were cut 9ft. in length and about 4in. in diameter. These were planted to a depth of 3ft. and 30ft. apart throughout the whole area.

The area was kept completely free from stock for three years and at the end of this period the willows had become firmly established. Stock was then allowed to depasture there, but a close watch was kept to make certain that the trees were not damaged.

This initial attempt was a complete success. Mr. Williams was encouraged

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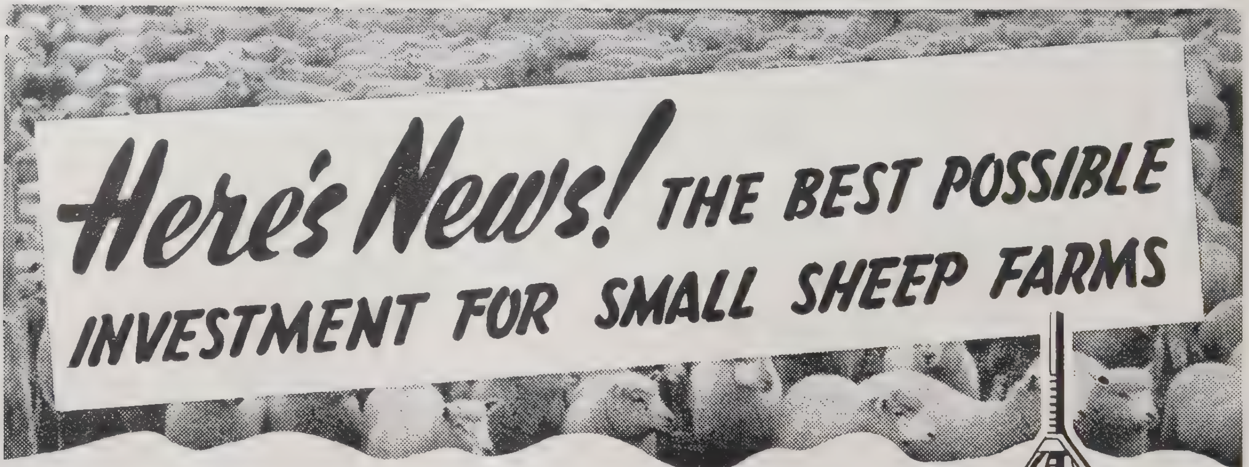

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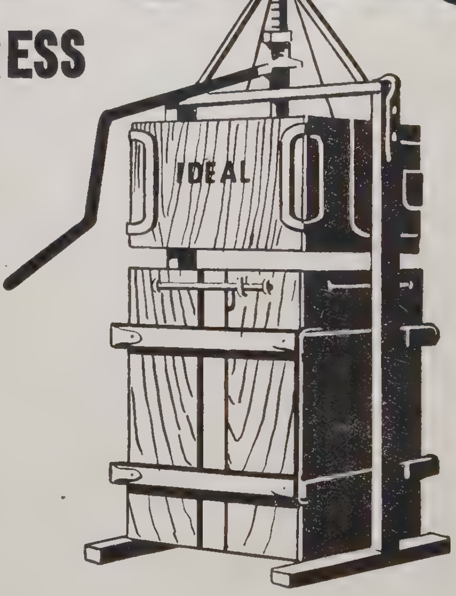

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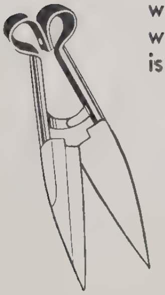

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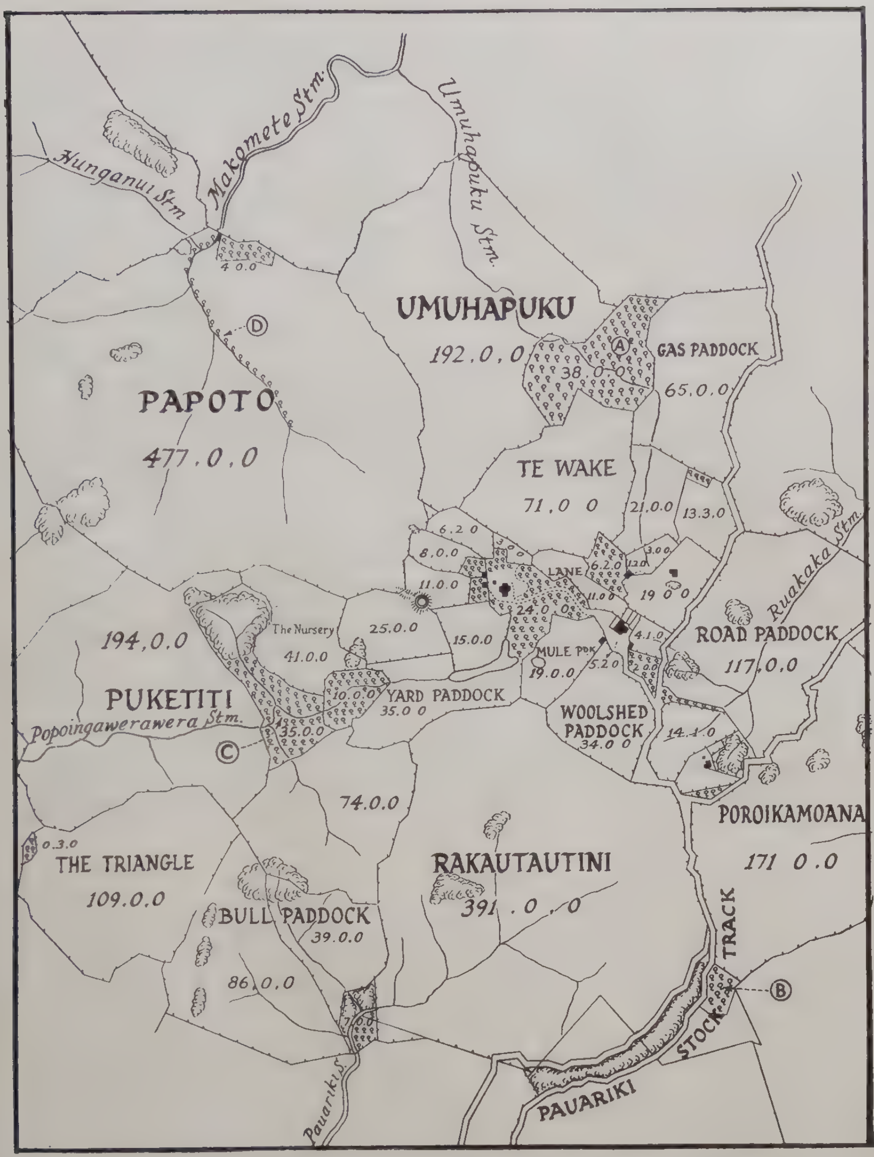
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Plan showing soil erosion planting control on Puketiti Station.

[*Lands and Survey Dept., Gisborne.*

to persevere with his policy. Today the area is completely stable and sheep and cattle depasture among the willows on an excellent sward of native and English grasses and clovers.

Mr. Williams is of the opinion that he has been more than fully compensated for the loss of the three years during which the trees were establishing by the stabilisation of the land and the greatly-improved pasture.

(b) The prevention of further slumping along the banks of a creek by the establishment of a plantation (area C on map).

In 1917, following very heavy rains, Mr. Williams observed that his stockyards were endangered by the slumping of the land on the Popoingawerawera stream. He realised that if this went unchecked it would entail the removal and rebuilding of his stockyards. In view of the close proximity of the area to tne homestead and its small value as a grazing proposition, Mr. Williams decided to fence the area off and establish a plantation of eucalypts, oaks, and *Cupressus macrocarpa*.

In order to combat the slumping, the land on the south side of the creek was dug in strips 30ft. apart and various eucalypt seeds, including *E. regnans*, *E. botryoides*, *E. obliqua*, *E. gigantea*, *E. hemiphloia* and *E. viminalis* were planted. With the exception of *E. hemiphloia* and *E. viminalis*, which are not suited to this particular station, the seedlings and transplants did well, especially *E. gigantea*. The north side of the creek was planted with seedling oaks and *Cupressus macrocarpa* and they, too, did exceptionally well. This planting resulted in securing the complete stability of the land on both sides of the stream and the saving of the stockyards. In addition, a very fine plantation of eucalypts, oaks, and macrocarpa has been developed.

Although Mr. Williams does not recommend the establishment of similar plantations as a general policy, he considered that, from a long-term view, it was economically sounder to adopt this method. As he points out, the plantation is now at a stage when many trees can be cut from the area and milled, leaving sufficient there to ensure the continued stabilisation of the land. The opening up of the plantation will allow for pasture establishment among the remaining trees and the land will eventually come back to grazing again.

(c) The control of creeks and the surrounding eroding land by the close and spaced planting of trees in the creeks, along the banks, and on the surrounding land (area A on map).

In 1924, the creeks and the Umuhapuku stream were causing serious land losses in the upper Te Wake and lower Umuhapuku paddocks. The whole area was slumping and on the move. The area was fenced in between the bottom of Te Wake and the boundary fence. Willows and poplars were then planted closely along the banks of the creeks and stream with odd ones in the main stream itself. The surrounding slumping land was planted with *E. serberiana* and *E. regnans* spaced 30ft. apart, and later, in 1926, with *Pinus insignis*. The area was kept free of stock for four years, at the end of which period the plantation was well established and it was safe to depasture stock there.

In this instance, Mr. Williams considered that because of the size of the area, it was cheaper to fence the whole area off rather than to attempt individual protection. In any case, the slumping was so severe that it was not possible to ride in the vicinity of the creeks and was so unstable that it could not be grazed by stock.

Today excellent pasture is growing among the trees, with the exception of the area sown with *Pinus insignis*. Because pine needles poison the grasses and clovers and have a marked tendency to self-sow, Mr. Williams advises against their use in erosion control on pasture land.

It is also interesting to note that even where the trees are close planted, quite good grazing is obtainable and complete stabilisation of the area has been achieved.

VIEWS OF AREA A ON MAP.

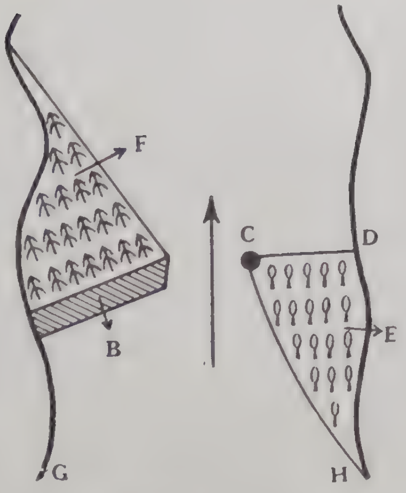
(d) The close planting of a 200-acre area which was eroding so badly that it was threatening the ruin of many acres of valuable grazing land.

This was the worst problem Mr. Williams had to deal with. About 200 acres on the south side of Puketiti Hill through which five creeks ran were carried away during heavy rains. The surrounding land was slumping and there was a grave threat to the land above and below the area. The whole area was fenced off and closely planted with *Pinus insignis* and *Cupressus macrocarpa*, and then left to grow into a plantation. This method successfully arrested the slumping of land in the vicinity of four of the creeks. With the fifth Mr. Williams is still persevering; he hopes that by building a series of debris dams he will eventually stabilise the whole area.

With the experience he possesses now Mr. Williams would never have planted *Pinus insignis* in the plantations, but would have grown trees such as the *Robinia pseudo* acacia, or some other useful station timber. Furthermore, practically all vestige of pasture has disappeared under continuous accumulation of pine needles. Against this, Mr. Williams found that when facing this problem the tendency of the pine to self-sow was a great help in establishing trees on the steeper parts which were very difficult to establish successfully by hand.

(e) The control of a stream, the meanderings of which were causing extensive toe erosion, and the consequent slumping of the surrounding land, by the building of live and dead groynes (area not on map).

The Onetehunga stream had developed a course meandering to such an extent that during heavy rains the flood waters cut into the toe of the steep surrounding land and caused severe slumping on either side of the stream. Over a period of years the gradual slumping became so severe that at one point the accretion of rubble would not permit the normal flow of water during heavy rains. The flood water would bank up and cover the stream bend from hill to hill. Mr. Williams considered that if the stream was confined to a central channel by a series of groynes, he could prevent the toe erosion and consequent slumping of the surrounding land.



Arrow indicates waterway. B. Stone groyne. C. 10ft. matai stump. C-D. 6-wire fence. E. Area planted in small poplars. F. Area to be planted in manuka. G to H. Creek bed 4 chains wide, covering from hill to hill during heavy rains.

In 1940, six stout wires were run from an old 10ft. matai stump standing about 1½ chains out in the creek bed and were sunk into the right-hand bank. Poplars were planted at 6ft. intervals along the fence and the wires were stapled to them. (See diagram.) The fenced area on the right-hand side of the creek was planted thickly with small poplars. On the left-hand side of the stream a stone groyne was built (as shown) and the fenced area forward of this will be thickly planted with manuka this winter. Mr. Williams anticipates that in three years this work will confine and control the creek sufficiently to enable him to put in a flood gate. He intends to build these groynes at suitable places further up the creek until he can confine the stream to a set course, thus preventing the continual toe erosion caused by earlier meandering of the stream. It is too early to claim any measure of success, but indications are that by confining the stream to a set channel (and with spaced planting of the surrounding land) the required result will be achieved.

Actually, Mr. Williams has done considerably more planting than has been described, as, for example, preventive planting of poplars and willows along the Makomete Stream, but the foregoing are five concrete instances of individual effort to solve erosion problems.

Naturally, with many years' experience in combating erosion, Mr. Williams has formed opinions about the best methods to be adopted.

Artificial Assistance

A property owner must consider many factors before dealing with any particular erosion problem: Whether satisfactory results can be achieved by planting alone, or whether artificial assistance to Nature in the form of debris dams has to be resorted to as well. Can stabilisation of eroding land be accomplished by spaced planting, or

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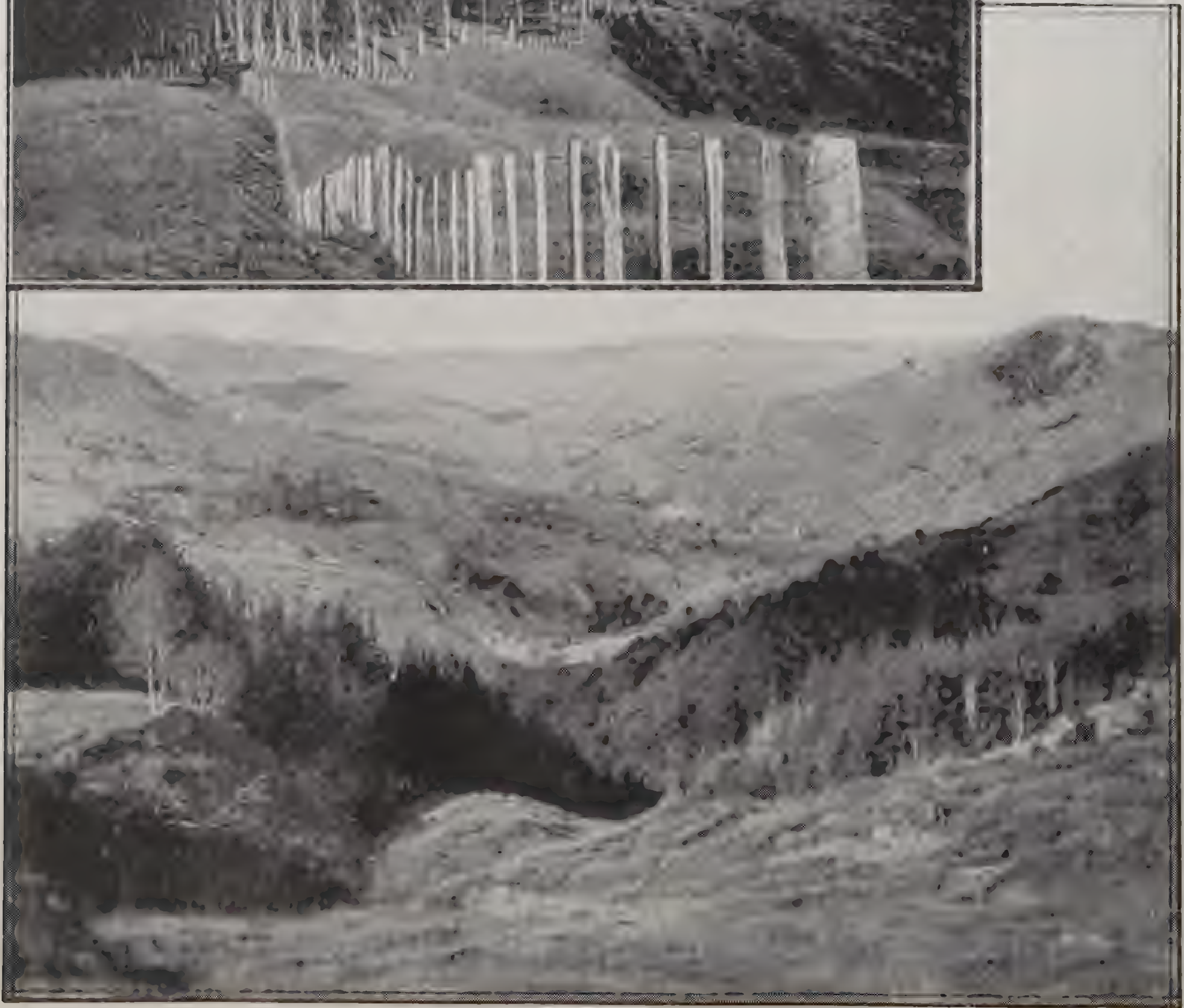
Upper—

Close planting of trees on area A.

Below—

200-acre block planted with *Pinus insignis* and *Cupressus macrocarpa.*



would it best be achieved by close planting? Would it be more economical to protect individual trees by various methods from stock damage, or would it pay to fence off the area completely from stock? Each problem has its own complexities and time spent in careful study of each undertaking will always pay dividends. Faulty and quick planning may lead to many hours' unproductive work.

Each individual must become a soil conservator and engineer to study out the problem. Each eroding area on Puketiti Station had to be dealt with in a different manner, according to the degree of severity and the main contributing factors.

Every problem was fully studied to ascertain the actual cause of the erosion; the plan was made accordingly. In this way a property owner may best solve his troubles and obtain the maximum benefit from his labours.

Mr. Williams firmly believes that when dealing with erosion prevention is cheaper than cure. He has profited by his experience and benefited from past mistakes. That is why he is continually watching his land. By judicious and systematic planting in areas which have a potential threat from erosion, Mr. Williams aims at forestalling the eroding forces. Suitably-sited trees protected from stock, whether there be 2, 5, or 10 to the acre, will often prevent erosion. Much of this spaced planting is embodied in the future planning of erosion control on the station.

In latter years he has fully realised that tree planting, debris dams, and live and dead groynes are, in themselves, not sufficient always completely to stabilise eroding land.

Balanced stocking, careful management, the surface sowing of slips, establishment of suitable clovers and grasses in pastures, and artificial manuring go hand in hand with the more laborious tasks of tree planting and debris damming. The soil must have as a protective covering a thick, dense pasture. Without this benefits from tree planting may be minimised.

Question of Economy

Farmers may raise the question of the erection of fences and the complete exclusion of stock until the trees planted have become firmly established. Mr. Williams considered that it was more economical to fence off the eroding area and prevent stock from depasturing, than to protect each tree individually. However, on a smaller holding, a farmer cannot always afford to have an area of land out of production. His property can no longer carry an economical number of stock, unless, of course, he overstocks other paddocks. This increased stocking would undoubtedly lead to the aggravation of some causes of erosion and the pasture would be asked to carry in excess of the optimum safe stocking. Therefore, the farmer has to consider means of protecting the trees he plants. Some farmers bind manure sacks round the trunk; others, scrub and manuka cuttings; occasionally small fences surrounding widely-spaced planting are seen. Recently it was suggested that Dannert wire could be used successfully by fixing the coil to the top of the sapling and pegging it to the ground. A farmer must learn by experience the best method; no matter how he accomplishes it, there is little use planting trees unless they are protected from grazing stock.

This raises the question of the destruction of trees by opossums. In many parts of this district hours of toil have been offset in a few short weeks by the depredations of opossums. In fact, in certain areas, it is almost impossible to establish trees successfully. Something must be done urgently if tree planting is to be a means of combating erosion in the areas where there is substantial opossum population.

The method of planting is also important. Whether the saplings or trees are put in with a post-hole borer, crowbar, or spade is immaterial. Points to remember are these:

1. **Cut saplings at least 11ft. long;**
2. **Whenever possible put them at least 3ft. 6in. into the ground;**
3. **Make certain each sapling is thoroughly rammed;**
4. **Remove the foliage, particularly from the top, to avoid loosening of sapling through wind; and**
5. **Re-ram any loose saplings two or three weeks after planting.**

Remember that the cutting, carting, and planting of saplings is laborious work and a little extra time spent in careful ramming will assure the farmer of a more complete establishment.

Then there is the question of the best type of tree for planting—a controversial subject. Willows, particularly the golden willow, bitter and pussy willow, are extremely useful for planting in and on the banks of creeks. Then there are the *Robinia pseudo* acacia, the prickly acacia, and a recently-imported variety developed in America from the common prickly acacia, or black locust, known as the shipmast locust.

Shipmast locust is being tried in various parts of New Zealand and should be of great value in erosion control. There are, of course, the poplars—the aspen, Lombardy, silver, and black poplars, all of which are useful for both spaced and close planting.

Two points need special consideration. Where it is necessary only to space the planting widely a quick-growing, good-rooting tree which will give shade can be considered; however, where the area is eroding so badly that close planting has to be resorted to, then consideration should be given to planting trees some of which in future can be used for fence posts and battens on the farm.

It is wise to establish in suitable areas on a property nursery plantations from which future requirements for planting can be cut.

The stabilisation of land can be achieved only by careful study of the problems. Tree planting must be combined with good management.

Erosion of Papa Soils

Hill-country farmers in Poverty Bay are faced with a very serious problem, as it is the fertile papa soils which are annually eroded. This can result only in a decrease in hill-country production and in an increased production burden being placed on the flat-country farmers in order to meet full requirements. It is a national duty to combat erosion and return the land to its previous balanced and stable condition where the only erosion which occurs is the slight amount of normal surface erosion expected in high-rainfall areas.

Mr. Williams and others, through patience and perseverance, have proved that man-made erosion can be arrested, and fertile pasture land stabilised.

Farmers of New Zealand should do their utmost to prevent the serious losses through erosion of so much valuable farming land.

Acknowledgment

The writer wishes to acknowledge the co-operation of Mr. A. B. Williams and of the Lands and Survey Department, Gisborne.

Pig Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in May, 1946, as follows:—

Auckland—1YA, on May 15, at 7.15 p.m., "Maintenance of the Layout," by F. Barwell, Supervisor, Bay of Plenty District Pig Council.

Wellington—2YA, on May 21, at 7.15 p.m., "The Value of Whey as a Pig Feed," by C. H. Sorensen, Supervisor, Taranaki District Pig Council.

Christchurch—3YA, on May 16, at 7.15 p.m., "Value of Pigs in Agricultural Farming," by H. McIntosh, Supervisor, Canterbury District Pig Council.

Napier—2YH, on May 14, at 7.15 p.m., "Planning the Season's Pig Meat Production," by H. Hopkins, Supervisor, Tairawhiti District Pig Council.

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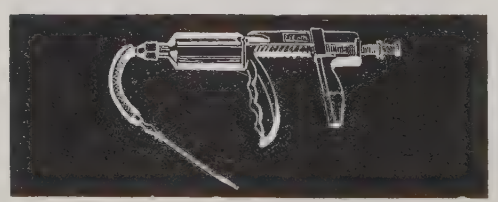

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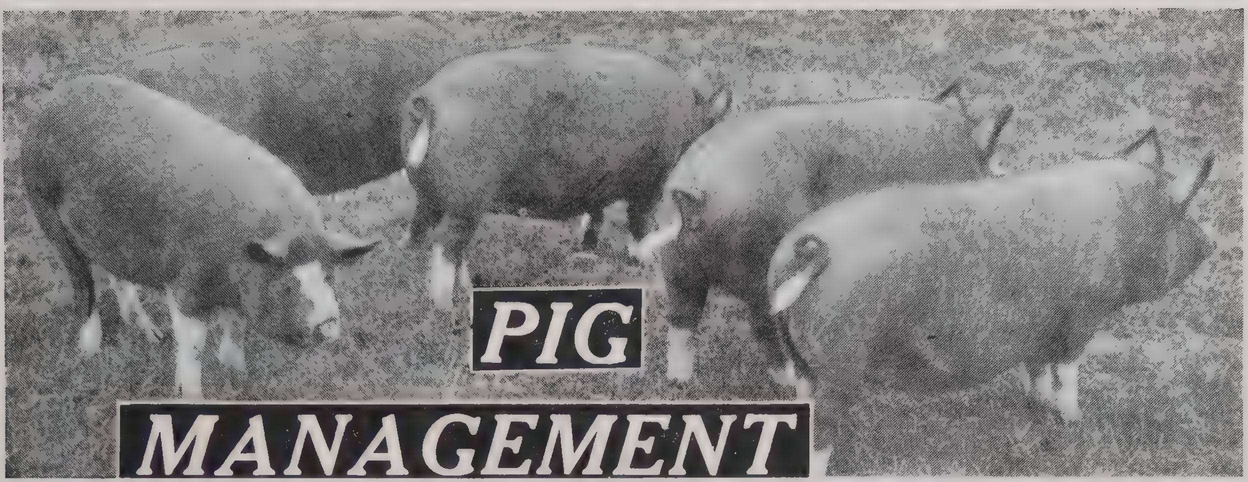

PIG MANAGEMENT

Industry's Value Could Be Doubled

By H. M. PEIRSON, *Superintendent of the Pig Industry, Wellington.*

THE high praise given New Zealand pigs in London recently, reported in the February, 1946, issue of the "Journal," should encourage New Zealand farmers to breed and feed for the requirements of the British market. That the figure of 680,000 pigs produced in the year ended September, 1945, could easily be doubled without attaining the goal of one pig per cow shows that the best economic use is not being made of dairy by-products in the production of pig meats.

The more intensive instructional work of District Pig Councils has been aimed at a continuous expansion of pig production, and in this article broadcast talks on pig breeding and management by District Pig Council Supervisors during the past year are summarised.

FROM their introduction into New Zealand pigs were looked upon as scavengers, and were treated accordingly. Poor accommodation was provided, little attention was given to them, a minimum expenditure was incurred on them, they had a maximum nuisance value always, and they produced to about half their capacity, but they showed such profits that they compelled interest. As awareness of their value developed, and as the slowing-up of the dairy cow development left more time for attention to pigs, pigs and cows became inseparable. Today pigs are kept on most farms where skim-milk, whey, or buttermilk is available, as pigs are the obvious users of this most valuable but too often despised feed supply.

Expansion of the industry began in real earnest in 1928, and has continued with slight interruption until the present. In the last 15 years, except for a period during the war, production has more than doubled. This development can be attributed only to the effort and interest of farmers themselves, but it may not be out of place to mention a number of factors that actually stimulated the interest of many who have made outstanding successes of pigs, especially since 1928. In that year pig recording began and created a mild sensation by advocating the production of 40lb. weaners, and suggesting that at 16 weeks pigs were 2½ times their eight weeks' weaning weight. Information about what constituted good management, adequate feed, and quality in pigs was collected by the recording clubs; breeders became more interested in quality, and ultimately, to meet the demand for instruction and advice, the National Pig Industry Council was formed. This body, composed of and controlled mainly by pig producers and allied interests, now advises on questions of pig production, and is largely responsible for instructional work on pigs. In every district there is a supervisor, whose services are at the disposal of producers on all matters relating to pigs.

Possibilities with Feed Supply

Information collected from all kinds of sources makes it clear that at least £4 worth of pigs can be produced per cow each year. If this were done by all, the industry would be turned into a £5½ million a year venture—just double its present value.

Dairy by-products equivalent to the milk from 1,400,000 cows are available for pig feeding. Any increase in pig production can be brought about only by providing and using the appropriate supplements to skim-milk. One cow's milk alone, fully used, could produce about £2 worth of pigs a year. Because of the seasonal way in which milk is produced, milk cannot be fully utilised when used alone, and because of its high feed value it is wasteful to use it alone except for fattening pigs. It is necessary to provide other feed when milk is absent, or to make the milk spin out. Roots or paddock feeds fill the bill, but to make the best of these some meal should be used with them when milk is absent. The ideal combination of pig feeds is skim-milk, meals, and roots or grazing.

Skim-milk provides between 600 and 650 million gallons of high-quality pig feed. Because it is not available in equal amounts each month, and because it is not easily stored, its use presents a difficulty that only the most progressive have overcome. Most people waste some of it at some time of the year, and even when it is all fed to pigs some is still wasted, because pigs are sometimes overfed and at other times underfed. If a pig is ultimately underfed, previous feeding represents the biggest waste.

Skim-milk fed alone produces an excellent carcass, and older pigs can grow naturally on skim-milk only. Fattening pigs, therefore, require no supplement of meal if milk is abundant. Any meals fed with skim-milk should be fed to pigs under 4 months old, or to make up for a shortage of milk in the off-season.

Whey supplies the equivalent of 80 to 90 million gallons of skim-milk. It has about two-thirds the feeding value of skim-milk, but because some is lost in cheese-making it is usual to reckon whey for pig feeding at half the value of skim-milk. Compared with skim-milk it has two further disqualifications: it has to be carted back from the factory, and it requires the use of a protein supplement. For these reasons much whey is wasted. Whey gives excellent results with all classes of pigs when fed with ½lb. meat-meal daily, and fed this way the value of whey is almost doubled.

About 40 million gallons of buttermilk, the feed value of which is the same as that of skim-milk, is available yearly for pig feeding.

Breeding for Seasonal Feed

Because little milk is available in late autumn, winter, and early spring, and because pigs have two litters a year, it is essential to provide something to take the place of milk. Every conceivable way of getting round this difficulty has been tried, but getting rid of the responsibility of winter pigs entails the penalty of buying dear stores in the spring or wasting milk. The only way out of the difficulty is to grow grass, roots, etc., use some meal, have as few big pigs on hand as possible in winter, and sell heavy baconers in mid-summer and pork or light baconers in May and June. Have some sows farrowing in May, June, or July. It is most important to have enough big pigs to use the flush milk, and this can be done with a minimum of winter feed by having sows farrow in May, June, or July. There is a most marked tendency to reduce the number of heavy pigs carried in winter, and to replace them by suckers and weaners; 3 to 4 suckers can be carried in place of every store pig.

To use the home-grown feed supply effectively some meal or grain is required, but as these are high-priced feeds they should be used judiciously and quantities measured.

Home-produced crops are generally of low feeding value. The kind to grow will depend on suitability of the crop on any particular soil, yield obtainable, and when the crop is wanted. Grass is most widely used, and provided pigs get 2 gallons of milk or 2lb. of feed, preferably concentrates, daily, whatever their size they can make good use of grass, especially from 3 to 5 months old.

Where attention is paid to details there is little difficulty in getting 1lb. or 1 ton of meat for every 6lb. or 6 tons of feed used. For the whole of New Zealand it is estimated that 8lb. of feed is used for every pound of carcass produced.

Care Brings Profits

The importance of using good breeding stock cannot be over-estimated. Pigs provide only carcass, and it must be realised that progress lies in appreciating the possibilities of good matings. The returns obtained from pig keeping are very closely associated not only with the selection of breeding stock, but also with the care and attention given to the sow. Neglect of the most important members of the herd is usually accompanied by unsuitable conditions for the rest. More than any other class of animal, the pig is a real source of profit and satisfaction to those who have ability to organise and plan.

Sows produce twice a year, and must be well fed between litters. Sows that lose weight during this period cannot nourish the litter they carry, nor produce a normal and thrifty litter. Feed used at this stage is a better insurance of a good litter than feed used at any other stage of litter production; production of good litters is the starting point of successful pig keeping.

Care of the Sow

Few producers appreciate the reproductive ability of the sow. Given the right conditions and attention she will produce seven pigs each litter, and will do this twice a year, making it possible to return to the farmer for his 12 months' labour a gross value of £50. A number of cases are recorded where a ton of pig-meat—£60 worth—has been produced from a litter of 13 pigs in 6 months.

After farrowing the sow needs 4lb. of feed for herself and 1lb. for every

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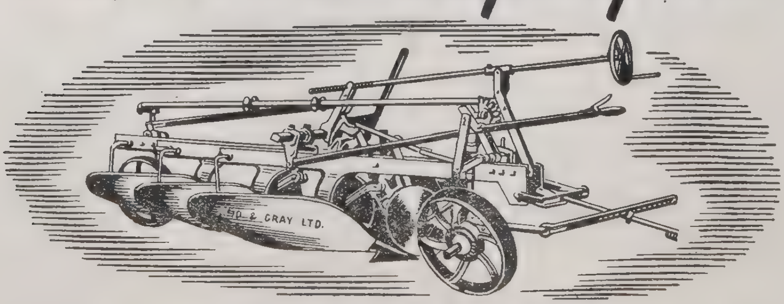
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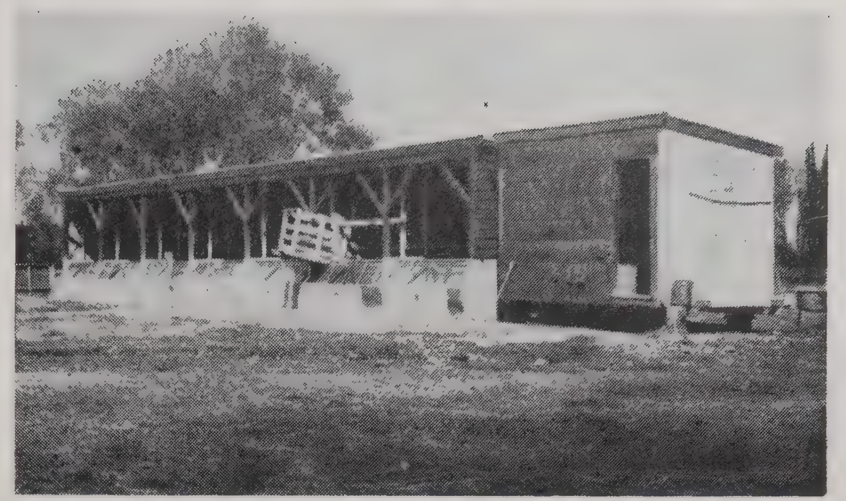
pig in the litter until the piglets are four weeks old. After the fourth week the amount fed to the sow should be gradually reduced and given directly to the young pigs in the creep. At the eighth week the sow is getting 6lb. feed, and the youngsters 2 to 2½lb. They start feeding at the creep at 3 weeks old, on ½lb. daily, and at weaning the 2½lb. supplies all they want, and weaning is no shock to them. It pays to feed sows and litters carefully, seeing that they get enough to let them grow satisfactorily.

Attention given to a litter from birth to weaning returns more than care spent on pigs at any other time of their lives. The litter is the pig harvest, and just as the abundance of the harvest is paramount in the profits of a farm, so the excellence of the litter is the foundation of profitable pigs.


Good accommodation reduces labour and production costs.

All animals at birth have a decided inclination to grow rapidly—the so-called "growth" force—and if this is destroyed by keeping them under conditions unsuitable for growth, the ability to resist infection or to eliminate poisonous by-products associated with digestion is lost. These infections, manifest in the weakly and usually blamed for poor health and growth, are secondary in nature. They are present everywhere, but do not appear in the thrifty pig, because he has higher powers of resistance. The thrifty weaner is thus the foundation of the profitable baconer.

The Litter

For the first three weeks piglets get almost all their nourishment from their mother's milk, and to relieve the strain upon the sow it is important that the litter should be encouraged to start feeding at 3 weeks old, or earlier if they are noticed trying to obtain food from their mother's trough. A creep should be erected where the pigs can obtain feed without interruption from the sow. A little new milk, skim-milk, molasses, or meat meal will often tempt them to start. This will not only make them independent of their mother, but they will also make more rapid growth, for occupation also brings contentment and contentment is allied to rapid growth. It is the most natural way of feeding little pigs, and they are getting exercise all the time, which promotes health. The growth pigs make at this stage is the cheapest and most economic throughout their lives.

The Creep

The quantity of feed required by the litter depends not only on the number of pigs, but on the individual weight of the pigs. The feeder must use his judgment and appreciate that the feed required by the litter increases daily.

A suitable feeding place should be erected and the pigs given all they will eat in the dry feeder and all they will drink in a trough. The main point, however, is to see that the food is at all times clean and wholesome; insanitary conditions retard growth. The creep also assists the less vigorous members of the litter.

The sow must be in the peak of condition before farrowing.

Weaning

Taking the sow from the litter and leaving the piglets in familiar surroundings for a few days to become used to sleeping by themselves is an important part of weaning. When several litters are weaned not more than 10 pigs should be run together, and then only when they have been graded into sizes. If too many are run together, crowding at the trough and in the sleeping quarters results in fighting, with the bigger pig gaining all the advantages at the expense of the little fellow, who makes little progress. Grading into sizes ensures the production of an even line of pigs that will be content to live and feed together.

Even fattening pigs should be let out to get a little greenstuff three or four times a week; an ounce of animal fat per pig daily ensures health. Soil or mineral matter is an aid to health, especially for young pigs. Treat pigs for worms if these are suspected; oil them to keep down external parasites and mange; watch for any signs of sickness. A 24 hours' starve is an excellent insurance against indigestion and stomach complaints. Isolate the sick pig and act promptly, as there is no profit in feeding pigs unless they are thriving.

Housing

Although the provision of adequate and cheap feed is the keystone of profitable production, it is obvious that something more than feed is necessary. Good houses and sanitation are essential for profitable pigs. In the past this side of pig production has been neglected, but its importance is now being generally recognised. If sanitation and housing pay dividends only in the sickness, disease, and death they prevent, it would be more than worthwhile, but they are far more fundamental. They influence the whole outlook towards pigs; they create pride of ownership, which is the mainspring of success.

There is no set of rules to define what is meant by good attention, but the results of the growing recognition of its importance in pig keeping are reflected in the continuous drop in rejected pigs over the last 9 years. Ten years ago rejections from all causes were greater than 18 per cent.; today they are less than 5 per cent. Successful pig production depends on these three items—cheap and adequate feed, good housing, and able attention.

Because pigs are used as scavengers and because they are hand fed, it is obviously necessary either to put them in sties when they are being used as scavengers, or else to fence them securely. Traditionally they are kept in sties because it is easier to keep a sty pig-proof than it is to keep any length of fence pig-proof. Sties have the lasting advantage that they keep pigs out of mischief, but they have numerous disadvantages. When pigs do not have access to green, growing material they become sick, unless their feed supply contains all that grass contains. Sty-fed pigs are notoriously subject to lameness and paralysis. Sties have to be cleaned out, a job that is so unpleasant that it is usually neglected. In the insanitary conditions that prevail many internal infections take a toll of young pigs, either killing them off or delaying their growth severely. The repugnant state of the pig-sty kills the owner's interest in pigs, and in the absence of owner-interest the pigs become unthrifty.

It is a matter of choice whether central or dispersed units are built. The saving of material by pooling all pig-houses is offset by the extra cost of drainage and water supply, which are essential to the central unit. The saving in time required for feeding in the central house is offset by the time required for cleaning out, but the central house enables the owner to keep the whole unit under better observation, and probably entails less unpleasant work with pigs, especially when the weather is wet. Both the open-air and the central lay-outs are excellent so long as they are not overstocked, and so long as they are given the attention necessary to keep them in good working order.

There can be no question that where pigs are well housed they will pay excellent dividends. It has been proved by every farmer who has gone to the trouble and expense of good accommodation that pigs kept in clean, well-ventilated houses and not overcrowded require less feed than where conditions are bad.

The National Pig Industry Council provides a pig instructional service throughout New Zealand, and farmers contemplating a new lay-out should seek the advice of the local District Pig Council, whose services are free.

Adaptability of the Pig

The evolution of the modern pig is quite an interesting study. No other animal has been called upon to provide such wide variations from its original form, habits, and body construction. The wild or semi-wild pig had to forage for itself, and required great hardiness and fighting ability to escape extinction, which led to the development of the head and shoulders.

It has ever been a prolific animal, and under the control of those who have sought, through breeding and selection, to improve its conformation, the response has been most generous. For instance, at one time carcasses weighing from 4 to 6cwt. and carrying a great proportion of fat were in popular demand, but subsequent preference for lightweight bodies and a predominance of meaty flesh led to the development of the after end of the pig, good loins, and hams; in other words, the evolution of the pig has transferred the weight from one end to the other. The pig has met these needs without sacrificing those great attributes of hardiness, prolificacy, and early maturity, together with the preservation of the particular excellence of the flesh, which has always been a favourite article of diet. Gervase Markham in 1638, speaking of the domesticated pig, said that "although troublesome, noisome, unruly, and greatly ravenous," it was, to him, "in the dish, so lovely and wholesome that all other faults may be borne with." So it is today. Consumers' tastes dictate the standard of any product. The present demand is for long, lean pigs that will give a loin cut with the greatest amount of meat with only a reasonable amount of fat. The bacon curer or butcher

10/6

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can find in a pig only what the producer has put in by breeding and feeding. Good hams and bacon and fresh pork cannot be manufactured out of poor pigs.

Baconer Competitions

The establishment of official standards for judging baconer carcasses not only gives the producer in attendance at competitions an understanding of the methods used to evaluate his pigs, but provides him with an opportunity of making a critical study of practices at freezing works and possible happenings to pigs in transit from farm to works; it emphasises the necessity of such marketing factors as suitability of weight and evenness of conformation; it results in the pooling of information and knowledge of the pig industry and brings into effective co-operation producers, export freezing works, curers, meat inspectors, buyers, and agents, who are concerned with consumers' tastes, which dictate the standard for any product.

When the consumer and the producer meet the desire of the consumer is fairly readily interpreted. So seldom, however, does the pig producer come into contact with the consumer that quality standards are necessary to interpret to the producer the character and type of live animal that can be expected to process economically into the most desirable finished product.

It is clear that those who produce pigs, market them, process them, and regulate and direct the industry all have responsibilities in determining the future of the industry. Attendances of over 1,000 producers at baconer competitions show that this responsibility is appreciated. It is clear, too, that the display of the meat industry's by-products is of great interest to the producer. Like the farmer who produces pigs as a means of using his dairy by-products, the meat industry and the curer have to find a profitable avenue for disposing of their by-products in a marketable form, for which the manufacturer has certain standards of excellence. The bacon-judging system gives these standards of excellence for pigs.

HOW TO BECOME A SHEARER.

Although it is only by practical experience that one can ever become a shearer, the main essentials to be mastered are clearly given in Bulletin No. 246, "Shearing." In addition to a detailed description, the bulletin contains 27 large illustrations showing the correct cuts and method of holding the sheep from start to finish. The bulletin is available from the Department of Agriculture offices at Auckland, Wellington, Christchurch, and Dunedin. Price 6d.

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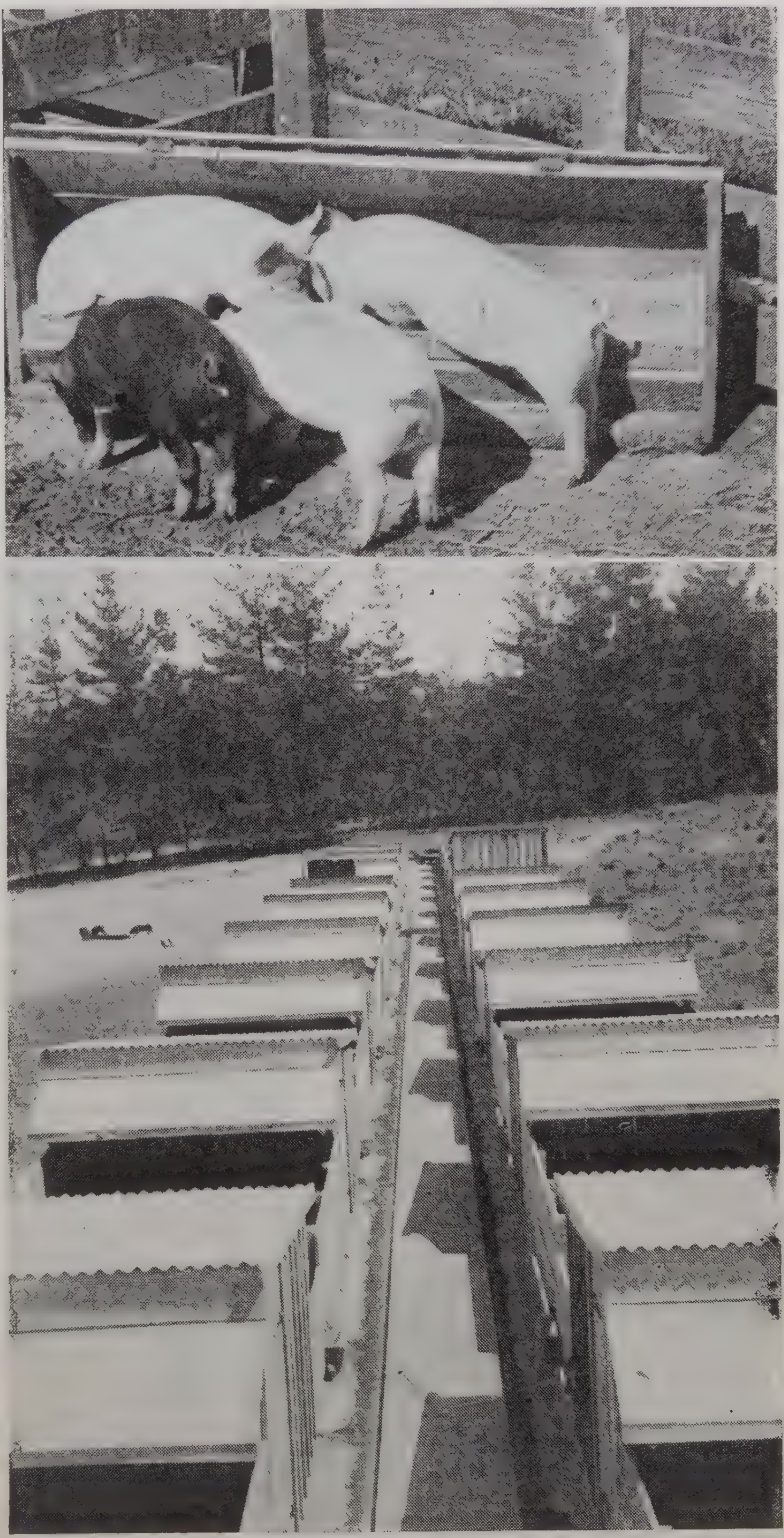

Above—A self-feeder is invaluable for suckers. Below—Good farrowing accommodation is essential for good litters.

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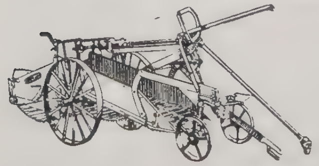

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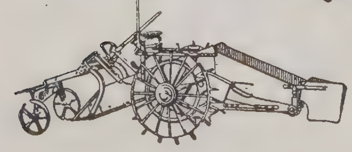

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PREPARATIONS FOR FRUIT-TREE PRUNING

By A. R. GRAINGER, *Orchard Instructor, Christchurch.*

IN most districts it is seldom practicable to start pruning of fruit trees until about the middle of May, as normal foliage does not fall much before then, and the completion of harvesting and general clean-up work require the attention of the grower for two or three weeks.

CAREFUL observation of the trees in an orchard from which a heavy crop has just been harvested will show most of the reasons for pruning. Broken branches and the presence of fire-blight, powdery mildew, or borer show that pruning is necessary. The removal of infected wood is one of the principal methods of disease control. The tops of some trees may be too high to be reached by the workers; branches may have grown out into positions where they are in the way of cultivating implements.

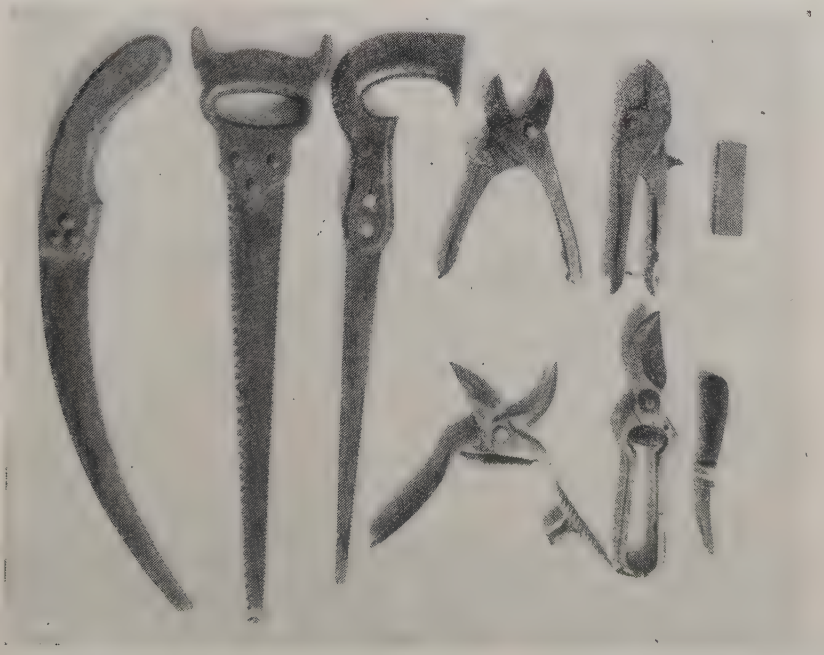
Pruning aims at the following:—

(a) Building a mechanically strong tree capable of carrying heavy crops of fruit without breakage of limbs;
(b) Securing a tree well suited for economy in orchard management —cultivating, spraying, thinning, picking, and pruning in subsequent years;
(c) Securing a healthy tree, free from diseases;
(d) Securing good-sized and well-coloured fruit; and
(e) Securing regular crops each year.

Tools for Pruning

Tools required for pruning are secateurs, saws, knives, an oilstone, ladders (a range of sizes) of the three-legged type, wound dressing, and a collecting sheet for prunings. An incinerator at a convenient location may also be included. Secateurs which cut cleanly and can handle the larger-diameter wood are the best type for pruning.

Several types of saws are suitable for pruning work. The California pruning saw is especially useful when heavy cuts have to be made well into the crotch of a tree, but curved tapering saws are the most convenient for general pruning work.



[*Green and Hahn photo.*

A good range of pruning tools. From left: Popular type curved pruning saw; two-edged saw; tapering saw; secateurs above Rolent or Snapcut pattern; secateurs below Boker type; pocket size oilstone, and below suitable type pruning knife.

The double-edged saw is not recommended as, when used in a narrow angle, damage to bark is caused by the teeth on the opposite edge.

Saw-cuts generally leave a rough edge to the bark of the stock, in which case a knife is necessary to smooth off the wound, particularly at the cambium layer, so that the formation of callus is not retarded. Long tree pruners for high cutting or for cutting distant branches have a limited use in the orchard; they are useful for keeping trees within the reach of normal pruning equipment. An oilstone is necessary for keeping cutting edges sharp—an important point.

Wound dressing is essential to prevent the entry into tree cuts of silver blight and wood-rotting fungi. Rapid callusing of the bark is desirable. This may be effected by a bitumen tree-wound dressing, provided that it is not combined with injurious substances.

Infected Portions

Many of the portions removed from fruit trees are infected with fungous disease such as powdery mildew (*Podosphaera leucotricha*), die back (*Clasterosporium carpophilum*), brown rot (*Sclerotinia cinerea*), bladder plum (*Taphrina pruni*), and coral spot (*Nectria cinnabarina*). Good practice,

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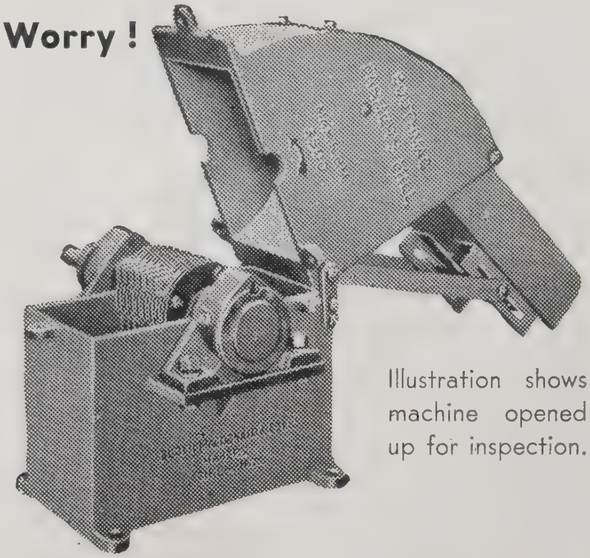

Illustration shows machine opened up for inspection.

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therefore, is to collect all prunings and burn them. To facilitate this two pruning sheets of strong hessian, measuring 20ft. by 10ft., may be used. A light batten should be attached across one end, and this is used as a grip when drawing the sheets from one tree to another. By careful planning, sheets can be handled so that they are full when close to the headland where neat piles of prunings are deposited to wait carting to the incinerator.

If the incinerator is portable and is moved about to the heaps of prunings, care should be taken to see that it does not scorch the trees.

While it is generally advisable to remove broken branches, sometimes it is desirable to retain the more valuable ones, as, for instance, splits in the crotch of a tree. For this reason the pruning kit should include a number of bolts and nuts, and some screw eyes and tying wire.

The economical pruning of commercial orchards can be done only by supplying workers with adequate tools. These will enable them to carry on without those delays which occur when there is a shortage of good equipment and which, over a three months' season, may amount to an appreciable number of man hours.

General Rules

Many factors influence the growth of trees; it is difficult, therefore, to lay down set rules for pruning. Generally, however, the following points apply:—

(a) A vertical shoot grows the strongest and tends to wood production rather than fruit;

(b) Horizontal shoots are more fruitful;

(c) A shoot with its head up above others generally grows more strongly than the latter;

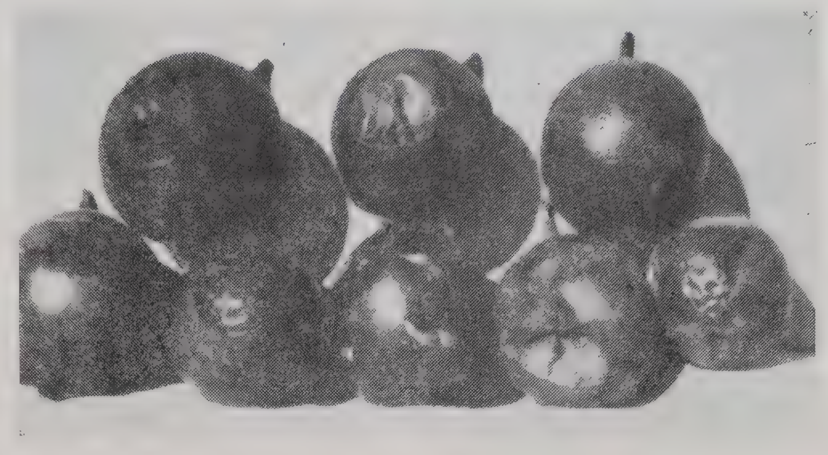
(d) Hard cutting back forces buds lower down, whether dormant or otherwise, to make growth; and

(e) An unpruned shoot will keep on extending for a few years but after the first year will gradually stop growing.

CHICK REARING.

"Chick Rearing," Bulletin No. 199, has just been issued by the Department of Agriculture. It is a very comprehensive treatment of a vital aspect of poultry husbandry. Copies are obtainable at 6d. (post free) from offices of the Department at Auckland, Wellington, Christchurch, and Dunedin.

TREATMENT OF SMALL FRUITS



Grease-spot infection of passion fruits.

THE small fruits strawberries, raspberries, and passion fruit demand particular attention during the autumn and winter. A. R. Grainger, Orchard Instructor, Christchurch, discusses in this article the treatment necessary for each fruit.

THE main object in autumn planting of strawberries is to get the plants established while the ground is still warm enough to promote root growth. They get away more rapidly in the spring than plants set out later. In southern districts, where winter sets in earlier than in the north, the aim should be to establish plants before the ground becomes cold and wet.

Raspberries

With raspberry varieties such as Lloyd George and Great American, which bear some fruit on the current season's wood late in the summer or early in the autumn, it should be kept in mind that this wood will be of no value for production next season and should be removed. Growers who have already removed the old canes will have to go over their plantations again after this late crop has been harvested and prune out the late-fruiting wood.

Where bud moth (*Carposina adreptella*) is present three applications of arsenate of lead, 2lb. per 100 gallons, are necessary, one in the autumn, another in the early spring, and again just at fruit set. Experience with other insect pests shows that unless all growers take efficient control measures there is likely to be an increase of bud moth in commercial production areas. The provision of an efficient spray pump is recommended.

Bordeaux 3-4-50 should be combined with the arsenate of lead where fungous diseases such as cane wilt (*Leptosphaeria coniothyrium*) and septoria spot (*Septoria rubi*) are present.

Passion Fruit

Control of grease-spot (*Phytomonas passiflorae*) requires the attention of growers in orchards where the disease is known to have been present. Grease-spot causes defoliation, dropping of fruits, and, in severe cases of infection, death of the vine. On the fruit the disease appears as oily spots which later turn into water-soaked areas. It is caused by a bacterium, and is most active in the late winter months. Bordeaux mixture at strength 3-4-50 applied at intervals of about a month assists in checking the spread of the disease, but with heavy infection removal of diseased wood, foliage, and fruit and their destruction by burning are advisable.

PASTURE PRODUCTION IN N.Z.

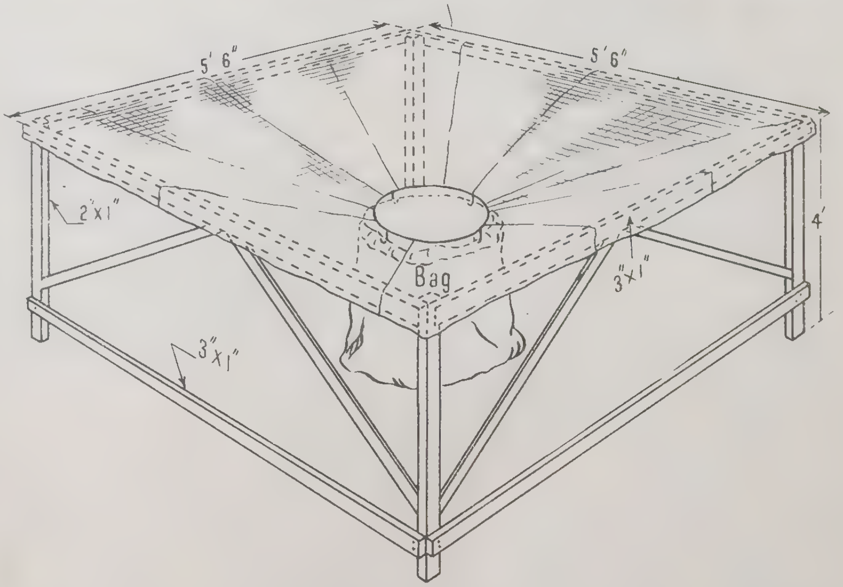
An outstanding summary of the appearance and uses of the grasses and clovers in the Dominion is given by S. H. Saxby in Bulletin No. 250, "Pasture Production in New Zealand." He discusses the different types of grassland with the management and seed mixture required for each. The topdressing, harrowing, and topping of pastures, the making of hay and silage, the establishment of new pasture and many other important practical aspects of grassland management are dealt with in a clear and helpful manner.

Obtainable from the Department of Agriculture, Auckland, Wellington, Christchurch, and Dunedin. Price 1/-.

Useful Bagger for Harvesting Maize

IN harvesting maize one of the most unwelcome jobs is bagging the cobs after they have been harvested. Not only is this a slow task, but when cobs are thrown into heaps quite a few often go astray and are missed at bagging time, particularly if the ground is at all weedy.

It was noticed in Motiti recently that one Maori maize grower had overcome this difficulty quite satisfactorily. He had constructed a very light timber frame about 5ft. 6in. square and 4ft. high. The legs and braces of this frame were of 2in. x 1in. timber, while the top frame was of 3in. x 1in. The top of this framework was covered with sacks sown together, which sloped towards a hole in the centre. This hole, somewhat smaller than the opened mouth of a superphosphate bag, was kept open by a ring of No. 8 wire, to which four hooks were fastened, on which the open superphosphate bag was attached.



The maize harvesters, after stripping the husks off the cobs, throw them on to the sacking top, which is stretched fairly tightly. The cobs roll down the sacking and through the hole into the bag, which is easily replaced when full. The pickers harvest quite a large area around the table and soon become adept at throwing the cobs accurately. Very few cobs miss the table, and the few that do are easily picked up later. Once the distance becomes too great for accurate throwing, it is only a matter of a few seconds to shift the bagger to a new position.

Seeing the bagger in operation leaves no doubt that it is a definite time and labour saver, and well worthy of being given a trial by any maize grower.

—A. V. ALLO, Instructor in Agriculture, Tauranga.

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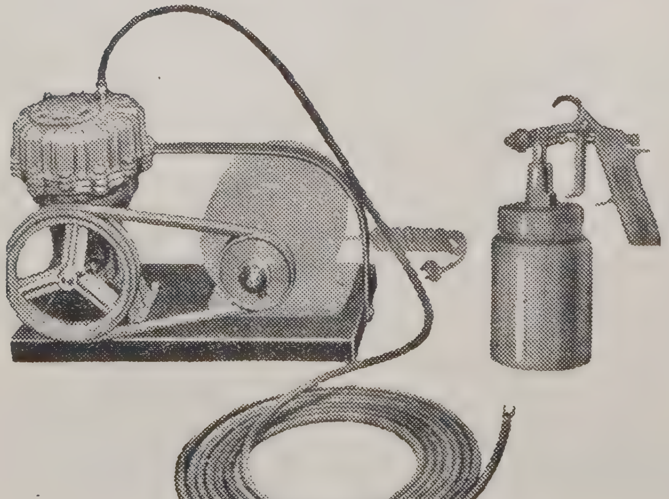

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HARROWING OF PASTURES:
CONTROVERSIAL ASPECTS

By **P. S. SYME,** *Instructor in Agriculture, Warkworth.*

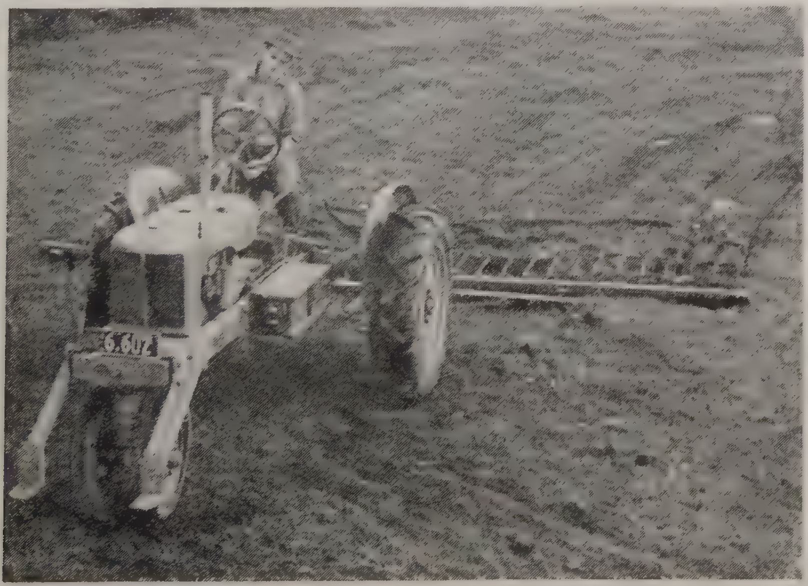
IS the harrowing of pastures really desirable and necessary? Many thousands of experienced dairy farmers would answer this question with an emphatic "yes," and would ascribe much of the excellence of their swards and their constant upward trend in production to the intelligent use of the harrow. To many, harrowing is, in fact, an accepted faith; to question its importance borders on heresy.

ACCORDING to circumstance, the grassland harrow may be designed primarily to spread animal droppings and comb out inferior grasses and weeds, or to open up and aerate the soil. These different requirements have resulted in a number of different types of harrow. Where the main object is merely to break down and spread the droppings the ordinary chain harrow or a light tripod harrow is satisfactory. The heavier pattern of tripod spreads the droppings and helps to tear out moss and roughage. A third type—which may incorporate a length of chain to spread the droppings—is fitted with a series of tines specially designed to penetrate and open up the soil. The harrow works to some extent on the principle of a flexible surface grubber.

Spreading the Droppings

While it is difficult to quote statistics showing the value of harrowing in spreading droppings, there is, at any rate, no lack of visual evidence to support the practice. It has been estimated that the fertilising material represented in one year's grazing on a good pasture may amount to as much as 98lb. carbonate of lime, 185lb. superphosphate, 500lb. 30 per cent. potash salts, and 750lb. sulphate of ammonia per acre. Since most of this is returned in the droppings, it is obviously very important that these should be used to best advantage. Imagine the effect of such a heavy concentration if left to fertilise only the area on which it fell. Moreover, these figures refer only to the arbitrary value based on chemical analysis, and every farmer with experience of the value of shed manure will agree that they tell only part of the story. The full story testifying to the unique value of animal manure can best be read in the rank patchy growth sometimes seen where droppings are left unharrowed. These rich luxuriant patches are rejected by stock and represent so much waste ground. Moreover, they tend to suppress the clover growth and result in severe over-grazing where the herbage is sweeter.

Valuable fertilising material is returned to pastures in animal droppings.



It is very important that animal droppings be spread evenly over the pasture by harrowing.

The proper use of the harrow results in a more even and uniform growth over the field with a greatly reduced waste of valuable fertiliser and less waste of ground.

Much Depends on Sward

In the growing season the benefits of such harrowings are often more pronounced on a second-rate rather than on a high-producing first-class sward and seem to be associated with the succulence and digestibility of the herbage.

Where the proportion of fibre is high, as is common where feed consists mainly of dry roughage, or where hay is being fed out, the droppings tend to remain in closely-packed clumps. As fresh green herbage is a laxative the droppings are more readily scattered and so tend to break down and become incorporated in the soil. Where the droppings tend to accumulate, common sense tells that harrowing is obviously desirable and profitable.

Chief Benefits

While the value of judicious harrowing of old-established pasture is beyond dispute, available evidence suggests that the main benefit results from the spreading of the cow droppings and the tearing out of coarse growth, fog, and moss, rather than from any cultivating or mechanical effect on the soil. On the other hand light spring harrowing of a young pasture often produces an astonishing improvement and may provoke an unthrifty-looking sward into vigorous growth. As the effect here cannot be traced to the spreading of droppings or tearing out roughage, it is probably due to the mechanical effect of the harrow in breaking the surface crust which tends to form during the winter on soil which had been worked up for autumn sowing.

Drastic Harrowing

Most dairy farmers have a proper appreciation of the conventional chain or tripod type of harrow; however, opinions differ about the merits of the much more drastic type of harrow specially designed to give soil penetration. Theoretically, the claims of deep penetration and drastic harrowing for certain types of pasture sward appear convincing. Where the sward consists mainly of sod-bound paspalum or where moss is prevalent it would at first appear highly reasonable to tear out the surface mat and encourage aeration by the use of a penetrating harrow.

It should be remembered, however, that the sod-bound, mossy type of sward is often merely the reflection of past bad management and low fertility.

A common sequence is to permit a rank uncontrolled growth of paspalum to smother out the clovers. Once the clover is gone, the ryegrass also goes. Fertility falls off and the paspalum is left in possession of a stricken field. It is sod-bound mainly because the standard of fertility will not permit of more vigorous growth.

Experience shows that such a sward often responds well to appropriate topdressing and management without any harrowing. Once the fertility is raised to the appropriate level, the high fertility-demanding species such as ryegrass and white clover quickly triumph over moss, which can compete only where conditions are unsuitable for the more valuable species.

Discussions relating to drastic harrowing frequently centre round the value of deep penetration and its beneficial effect on aeration and root trimming. The benefits of aeration may be open to doubt, and it is difficult to understand why the cutting and damaging of the root system should be expected to encourage plant growth. Experience with most plants in this connection is to the contrary and root trimming may indeed prove extremely harmful, as anyone who has cultivated too close to a row of maize can testify.

Effect on Weed Establishment

Another point sometimes of importance is the effect of drastic harrowing on weed establishment. It has long been contended that the best defence against weed invasion is a tight sward. Obviously, if a pasture is well scarified by penetrating harrows, the tendency is to produce conditions which approach the ideal for the establishment of many of our worst weeds such as Californian thistle, ragwort, buttercup, and rushes. These enemies of the farmer miss few chances and may be expected to take full advantage of any mistakes in pasture management; once established, they may be hard to eradicate.

While experimental evidence of the value of drastic harrowing is by no means conclusive, it is worthy of consideration. In order to test the effect of a penetrating harrow on pasture growth, a carefully-conducted trial was laid down on the Marton experimental area in July, 1934. The sward comprised mainly ryegrass, dogstail, and white clover. As it was grazed entirely by sheep and contained no mat or coarse patches, the benefit, if any,

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would be due to aeration and root pruning. The results in the following table were obtained over three seasons.

	Total production dry matter per annum. lb.	Relative yield.
No harrowing	30,243	100
Harrowed in autumn ..	30,282	100.1
Harrowed autumn and winter	29,935	99.0
Harrowed in winter ..	29,379	97.1

It will be noted that none of the treatments shows any significant difference from the unharrowed area, and this applied throughout the trial. Although fairly definite, so far as drastic harrowing on a good sheep pasture is concerned, the results might not apply to a dairying pasture badly affected with moss and sod-bound paspalum.

In order to test the effect of a penetrating harrow on sod-bound paspalum a trial was laid down at Ruakura on a paspalum-white clover sward typical of large areas throughout the north. From the first harrowing in July, 1937, till the second harrowing in August, 1938, no difference could be detected between the harrowed and the unharrowed area, and there was no statistically-significant difference in the weights of herbage produced throughout that period.

Although the two experiments quoted show no gain in favour of drastic harrowing, they relate only to two types of sward, and, considering the importance of this subject, there is room for further experiment on some of the numerous very inferior types of pasture land where a penetrating harrow might be expected to show up to better advantage. Certainly, vigorous harrowing can be an excellent precursor to the surface sowing of grasses and clovers, and where the two operations are combined with suitable topdressing they can be used to advantage to renovate a pasture, particularly as the surface-sown seed helps to prevent the intrusion of weeds as well as to introduce more valuable pasture species.

To be too dogmatic is not wise, particularly with a controversial subject about which even the best farmers disagree. However, for such work as spreading cow droppings or tearing out roughage on an average dairy pasture when this is obviously required, or for breaking up the crust of a young pasture in the spring, practical experience has long shown the harrow to be a very valuable implement. For work of this kind the pull required is relatively light, and with ample tractor power now available on many farms the coverage of the harrow could with advantage be increased so that the work could be performed more quickly and at less cost. Whether the deep penetrating type of harrow is as good an investment may be a matter of opinion, but farmers who are convinced of its efficacy will no doubt continue to use it.

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Answer to Correspondent

Lameness in Cows

"E.W.S.," Te Kuiti:—

Could you advise me on what treatment would cure or prevent my cows from long hooves, as they go very lame, especially in wet weather. I have a herd of 40, and about 20 are affected. The trouble generally starts after they reach 4 years or over, when they grow long feet and seem to walk on the heel more than square on the whole foot.

A few details of my farm may help you to arrive at the cause: Farm—90 per cent. flat; soil, light volcanic loam overlying pumice. Pasture—rye, white clover, paspalum. Topdressed yearly, super or basic super, or serpentine, and lime. Licks always available.

Cows I have bought in as heifers are also affected, some worse than stock I have reared.

LIVESTOCK DIVISION:—

Cows are most likely to develop long hooves during wet weather when the pastures are soft. There is no way of preventing the growth of the hooves, which should be kept trimmed and not allowed to develop to the stage where they are misshapen. When hooves are allowed to grow very long before trimming is performed a certain amount of deformity takes place in the hooves, and even after trimming in these cases the results are not always satisfactory.

The lameness you mention will be due to foot-rot, a condition caused by the entrance of germs, through abrasions or slight injuries, between the toes. When a cow is noticed to be lame the feet should be thoroughly trimmed, the affected foot washed, and all loose and dead tissue removed from between the toes. Soaking the foot daily in warm water to which an antiseptic has been added will help to loosen the dead tissue and facilitate its removal. After the "core" has come out bluestone, ½oz. to a pint of water, can be applied to the area between the toes, followed by a dressing of stockholm tar.

In the prevention of foot-rot the surroundings of the cowshed should be thoroughly cleaned up, as also should the mud around gateways.

◆

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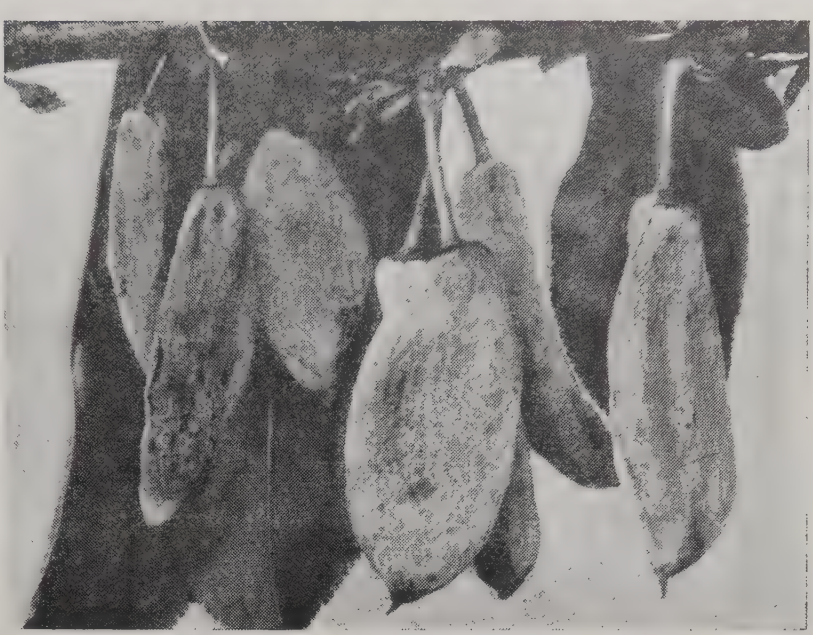
Bladder-plum and its Treatment

BLADDER-PLUM is a disease of the plum caused by the fungus *Taphrina pruni*. It is common on Japanese varieties, but somewhat rare on those of English origin. The appearance of the disease and the necessary remedial treatment are described in this article by G. H. Cunningham, Plant Diseases Division, Department of Scientific and Industrial Research, Auckland.



[W. D. Reid photo.

Bladder-plum on Japanese plum.

FRUITS, leaves, flowers, and shoots are attacked by the fungus. Infected fruits become inflated, elongated, curved and twisted, and spongy in texture. They are hollow, since the stone does not develop. At first green, infected fruits soon change to white, and become wrinkled and covered with a delicate bloom. Finally they turn brown and fall to the ground. Fruits of English varieties when infected do not enlarge but may be detected by change of colour from green to white often blotched with red. They are, however, hollow and spongy.

Leaves show symptoms shortly after they unfold from the bud. They then resemble peach leaves infected with leaf-curl, appearing blistered and yellow or reddish in colour. After a time they, too, turn brown and fall from the tree.

Blossoms are seldom attacked. When infection does occur they are killed shortly after emerging from the bud.

Shoots are regularly infected. They then appear lighter in colour than the normal, are somewhat swollen, and sometimes distorted and twisted. Frequently growth is retarded so that short shoots develop with leaf buds close together. Sometimes the terminal part of the shoots may be killed, when short secondary laterals develop and produce diseased fruits in the following season.

Life History of Fungus

The causal fungus, *Taphrina pruni*, is of the same genus as the organism causing leaf-curl of peaches and has, as far as is known, a similar life history.

Trees first become infected in the nursery, and once the fungus has become established, infection persists through the life of the tree.

Hyphae of the fungus persist in infected shoots. In early spring they grow through the stems into developing fruits. Here they ramify between the cells of the fleshy parts of the fruit and stimulate the cells to excessive growth. Leaves are similarly infected.

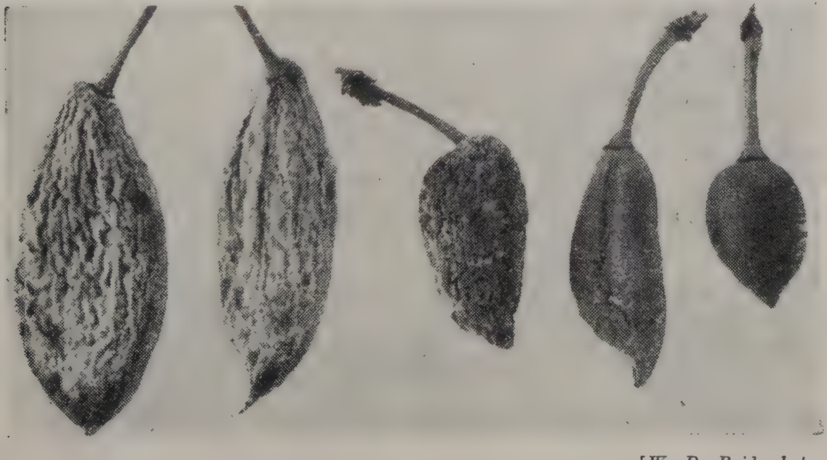
On surfaces of infected fruits the asci, or spore-bearing bodies, of the fungus develop, forming a delicate bloom. Spores are discharged from the asci and when carried by wind to adjoining leaves and shoots may infect these in turn. Shoots thus infected develop a perennial mycelium, which persists as long as infected shoots remain on the tree.

Remedial Treatment

As the disease is perpetuated by infected shoots, first step in control is to remove such causes of infection. Cutting out is best done during the early part of the growing season, when infected fruits are present and infected branches conspicuous.

Wounds should be painted over with bitumen paint immediately to prevent entry of the silver-leaf fungus.

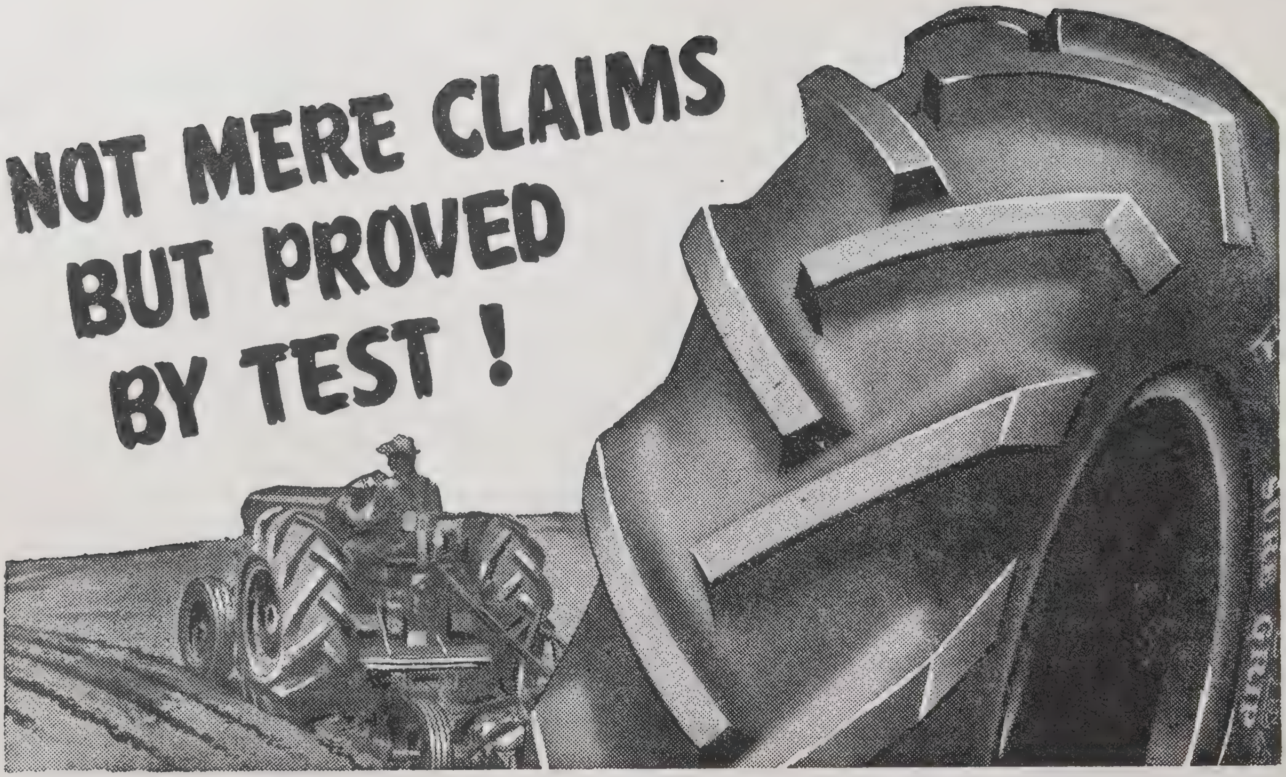
A spray of Bordeaux 5-4-50 should be applied to infected trees as soon as the buds begin to swell, but before they expand. A second spray may be applied with advantage ten days later. To prepare four gallons of Bordeaux of this concentration, use 6½oz. of copper sulphate to 5¼oz. of hydrated lime.



[W. D. Reid photo.

Infected fruits, natural size. Normal fruit is shown on the right.

NOT MERE CLAIMS BUT PROVED BY TEST !



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GREATER PULL

Tough, self-cleaning lug bars that are disconnected for easier penetration into soil — producing maximum pull, minimum slip.

EASIER RIDING

Properly angled evenly-spaced lug bars, over-lapping at centre, mean smooth rolling on highway without jolts, jerks.

STRENGTH

Lug bars buttressed at base like a dam for extra strength to stand alone, to bite deep and hard without danger of tearing off.

DOES 6 DAYS' PLOUGHING IN 5 DAYS TIME — SAVES FUEL, LABOUR, TYRES

Deeper bite with minimum slip. That's the thing that determines a tractor tyre's efficiency — the thing that *open-centre* Goodyear Sure-Grips have more of than any other tractor tyre built.

Tests prove it. It's because Goodyear's tough, self-cleaning lug bars are tapered and disconnected. The sharp, leading edge of each lug bar penetrates the soil more readily than closed bars, just as a fork penetrates more readily than a spade. The tapered, disconnected bars permit *deeper* bite — thus providing more ground for those strong bars to push against to achieve maximum traction and minimum slip.

When tyres slip—the tractor loses forward motion. But its engine continues to run, to consume fuel. And when tyres slip, they grind off rubber. Thus Sure-Grips save fuel and tyres as well as time and labour.

In addition — those same hefty lug bars are angled and overlapping at the centre for jolt-free travel on the open road — buttressed at the base for *extra strength* to stand alone. Naturally, when you buy new tyres for your tractor, you'll want the kind that makes fullest use of power, fuel and time. Buy Goodyears when you buy. Meantime take the best possible care of the tyres you now have.

GOODYEAR

Sure-Grip OPEN CENTRE TRACTOR TYRES

Dominion Executive Meets

MEMORIAL RECOMMENDATION REPORT

THE erection of special wings at Massey and Lincoln Agricultural Colleges for the accommodation of Y.F.C. students taking short courses at the colleges has been recommended to the Y.F.C. Dominion Executive Committee by the National Y.F.C. Memorial Sub-committee as an appropriate national Y.F.C. memorial.

The matter was discussed at a two-day meeting of the Y.F.C. Dominion Executive Committee in Wellington on Tuesday and Wednesday, February 26 and 27. The Dominion President, Mr. F. S. Atchison (who is also chairman of the Auckland Y.F.C. Council), presided over a representative gathering, delegates being present from all four councils. Those present included Messrs. L. J. Wild (Grand Patron of the federation), T. E. Streeter (immediate past president), J. M. Smith (Director of the Fields Division, Department of Agriculture), J. L. Sunderland (chairman, Wellington Council), W. A. Young (chairman, Otago-Southland Council), D. S. Ross, G. Spratt, I. D. Spratt, A. J. Voss, D. E. Waide (Auckland Council), S. G. V. Avery, S. J. Avery, B. J. Collerton, D. G. McLachlan (Wellington Council), D. Hurford, S. A. La Roche (Canterbury Council), H. M. Hubber, E. Rabbidge, W. F. King (Otago-Southland Council), L. W. McCaskill (Lincoln College), W. A. Jacques (Massey College), J. H. Bremner (N.Z. Farmers' Union), A. V. Lithgow (hon. secretary, Wellington Council), and S. Freeman (Dominion Organising Secretary).

Apologies were received from the vice-president, Mr. Jas. Barclay (also chairman of the Canterbury Council) and Messrs. C. Eyre (Auckland Council); M. Donald, W. F. McLaren (Wellington Council), R. S. France (Canterbury Council); K. J. Hargest, S. R. Whyte (Otago-Southland Council), and A. P. O'Shea (N.Z. Farmers' Union).

Memorial Report Adopted

The main business of the meeting was the presentation and consideration of the final recommendations of the National Y.F.C. Memorial sub-committee. After considerable discussion the sub-committee's report, with minor alterations, was adopted; this will be submitted to the annual general meeting of the federation, when the form the National Memorial will take will be decided and quotas allocated to the various councils for the collection of funds.

The sub-committee, which had reviewed all the suggestions and ideas forwarded from units of the federation, was influenced in its decision by the fact that the majority of schemes submitted indicated a desire, directly or indirectly, for the provision of educational facilities, mainly as scholarships or bursaries with an agricultural trend. It was considered that, in normal times, there should be no dearth of scholarships from various sources. There is at the present time a shortage of accommodation at the agricultural colleges; this congestion may last indefinitely, or, at any rate, while rehabilitation students are being catered for. There have been frequent demands in the past from groups of Y.F.C. members throughout the Dominion for short courses at the agricultural colleges. During the past few years the colleges have been unable to accede to these requests because of accommodation difficulties. The demand for these short courses is increasing annually.

The sub-committee has recommended, as a National Y.F.C. Memorial, the provision of accommodation for short-course students at the two agricultural colleges—Massey and Lincoln—by using the funds, collected and subscribed, for the erection, in each case, of a special wing for the use of Y.F.C. members undertaking short courses at the colleges.

The proposed wings could, it is understood, be included in the colleges' respective building programmes, and would be known at each college as the Y.F.C. Memorial Wing. A Memorial Stone and Roll of Honour could be a feature of both buildings.

It is considered that the adoption of this scheme, if approved by the annual general meeting of the federation, will provide a fitting and permanent memorial. The buildings will perpetuate the deeds and sacrifice of members lost in battle, and as memorial structures they will be a continuous reminder to the many—including our own members—who pass through the colleges to their agricultural careers; they will also attract the attention of visitors from far and near. As practical memorials they will, in addition, assist in extending the work of the Y.F.C., and benefit, perhaps, the dependants of deceased members. The memorial value of these buildings will be considerable, for they will stand as symbols at the centres of agricultural progress in each island; they will benefit large numbers of Y.F.C. members annually; and they will further the ideals of the Y.F.C. movement in New Zealand. We feel sure this would have been the wish of members who died on service. The Dominion Executive Committee considers that the proposal will be very favourably received at the annual general meeting of the federation.

Mr. McCaskill reported on behalf of the Lands Settlement sub-committee. A further circular is to be sent out, in the form of a questionnaire, copies of which will be made available to all members; because of the value of the information that can be disclosed, it is hoped that **all** members will take the matter seriously and fill in their questionnaire.

"Sister" Movement

A report was also presented by the sub-committee appointed to investigate the possibilities of forming a "sister" movement for rural young women on similar lines to the Y.F.C. The committee had met representatives of the two women's organisations—the Women's Division of the N.Z. Farmers' Union and the Women's Institutes—both of whom were willing to give their support. It had been suggested that the new organisation be called the Country Girls' Association, and a "skeleton" constitution had already been drawn up and submitted to the women's organisations for their approval. The new movement will be entirely independant of the Y.F.C., but, as the two organisations will have much in common, it is anticipated that they will be of assistance to one another in many ways.

Position of Clubs

The Dominion Organising Secretary, Mr. S. Freeman, reported that the number of active clubs to date was 156, comprising 46 in the Auckland Council area, 53 in the Wellington Council, 30 in the Canterbury Council, and 27 in the Otago-Southland Council area. There is still a large number of the older clubs in recess, and suggestions were advanced for the speeding up of their revival and the formation of new clubs wherever possible. Councils and district committees were urged to inaugurate campaigns in their respective areas to have the movement in as strong a position as possible by the annual general meeting of the federation.

General discussion followed the report and the following motion was carried: "That each of the four councils be recommended to frame a policy covering at least twelve months, with special consideration to district committee problems; the respective policies to be submitted to the Dominion executive committee for that body's information." A further recommendation with a view to stimulating interest was made as follows: "That all clubs endeavour to formulate a programme of activities, lectures, etc., in advance for the coming year."

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....

Following discussion on a remit from the Wellington Council relating to the appointment of Y.F.C. members as associate judges to the various breed societies, and recognising the need of uniformity and efficiency, the following motion was carried for the guidance of councils and district committees: "That we recommend for associate judges members who in our opinion come up to a standard of excellence in judging, and that for this purpose we adopt the standards as laid down by the individual breed societies."

Mr. Jacques gave further information on the proposal from Massey College to make its library available to clubs under certain conditions. It was decided to ascertain from the Country Library Service what assistance it would be prepared to give in securing and lending certain technical agricultural publications not generally available. It was understood that both Massey and Lincoln Colleges would be willing to assist with their libraries if necessary.

A remit from the Auckland Council urging that the federation consider the arranging of international Y.F.C. tours at an early date was considered. It was the general opinion that shipping difficulties would preclude such arrangements for some time, but it was agreed that information regarding routes, costs, etc., could be obtained in the meantime.

The matter of Y.F.C. representation on the Federated Farmers' organisation was left over for discussion at the next meeting.

Mr. J. M. Smith, Director of the Fields Division, Department of Agriculture, drew attention to the urgency of the fodder position in the drought-stricken areas of the North Island, and stated that steps were to be taken to make available as much fodder from other localities as possible; a motion was carried "That all units of the Y.F.C. federation be urged to take an active part in supporting any Government action that would make fodder available to the drought-stricken areas of the Dominion."

It was decided to hold the next meeting of the Dominion executive committee at Christchurch on Thursday, May 9.

Annual Meeting

The annual general meeting of the federation this year is to be held in the Otago-Southland Council area, and at the request of that council it was arranged for the meeting to take place at Invercargill; it was decided that, following last year's experience, a two-day meeting would be advisable, and it was agreed that the meeting be held on Wednesday and Thursday, June 12 and 13.

The Y.F.C. and Radio Broadcasting

IN implementing the aims of the Y.F.C. movement the value and possibilities of the radio have not been overlooked. Before the war the main national stations featured Y.F.C. sessions, often as part of a weekly series presented specially for farmers. Such sessions embraced not only talks on practical farming subjects—prepared and frequently presented by Y.F.C. members themselves—but also addresses on the Y.F.C. movement.

A Y.F.C. session introduced before the war by the very active Manawatu Y.F.C. District Committee operated most successfully over Station 2ZA, Palmerston North, until the war necessitated its discontinuance It resumed, however, for a time, with the assistance of Mr. W. J. Croucher, of Palmerston North, who gave talks on pioneering in the Manawatu. The session was much appreciated by young farmers and others, but circumstances compelled it to be discontinued for a further period.

In March, 1944, the Wellington Y.F.C. Council took over the session and arranged for a monthly 15-minute broadcast from 2ZA, Palmerston North; the popularity of this prompted the arrangement of a weekly series. Of the 15 minutes in each session, approximately 10 are devoted to talks and lectures, and the remainder to propaganda and announcements.

The Y.F.C. series from 1YA, Auckland, is conducted by the Auckland Y.F.C. Council, and consists of eight monthly broadcasts, from March to October in each year. These sessions last for 15 minutes instead of 20 minutes as before the war. Three sessions are reserved each year for talks on the Y.F.C. movement, while the material for the remainder is prepared and broadcast where possible by club members.

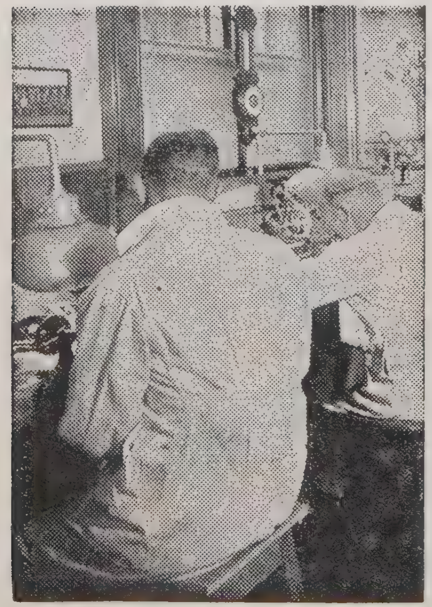
Value of Broadcasts

The Y.F.C. broadcasts, which aim mainly at providing instructive addresses for members and others in their homes, were of particular value during the war, when transport and other difficulties necessitated the curtailment of meetings.

In preparing and presenting talks, Y.F.C. members gain valuable experience. Their subject matter is usually very practical, and applicable to local conditions. Appeals, propaganda, and previews of club activities from 2ZA, Palmerston North, have done much to assist in the campaign for the revival of clubs and the formation of new ones, and the sessions have proved of great publicity value to the Y.F.C. movement. The talks and lectures are also of special value to farmers generally, who are never too old to learn.

We are deeply indebted to the speakers who willingly give time and labour in preparing and presenting scripts. The Y.F.C. has the active co-operation and assistance of the Department of Agriculture and other Government

Broadcasting from 2ZA, Palmerston North. From left: Mick Marshall, Ivan Tabor, Malcolm Gray, Ken Coles. Ivan Tabor, chairman of the Whakarongo Y.F.C., is the Y.F.C. announcer from 2ZA. The others are Marton Y.F.C. members, broadcasting a talk in the weekly session.



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Departments, scientific research workers, producer organisations, and breed societies. Scripts have also been provided by trade professionals, doctors, practical farmers, and others. All this, together with the fact that the interests of the farmer of today cover a wide range of subjects, has made it possible for the broadcasts to embrace a great variety of talks.

Listeners' Appreciation

How large an audience have the Y.F.C. sessions? Do the number of listeners justify the work that the sessions involve? The answers to these questions can be supplied only by the listeners themselves, and they are asked to post their opinions of the 2ZA sessions to "Radio," Box 112, Palmerston North, and of the 1YA broadcasts to "Y.F.C. Radio," Department of Agriculture, Auckland.

It is recognised that farmers generally are not keen correspondents, and the response to a request for farmers to send in their problems to be answered in the Palmerston North sessions has been extremely disappointing. Pertinent questions sent in and appropriate answers given over the air can greatly assist in imparting knowledge. If the question is a valuable one, even if you know the answer yourself, send it along to be broadcast. The Y.F.C. session from 2ZA, Palmerston North, comes on the air every Friday at 8.35 p.m. It is hoped that at an early date a more convenient evening can be arranged. The session from 1YA, Auckland, is broadcast at 7.15 p.m. on the last Monday in the month, from March to October.

Copies of Scripts

The scripts of talks broadcast in the Y.F.C. session from 2ZA, Palmerston North, usually contain about 1,400 words - often representing several hours of thought and writing even by a person thoroughly familiar with his subject. These scripts are of undoubted value, and so that they may be made available to more young farmers, the Wellington Y.F.C. Council is arranging for a selection of about 20 radio scripts to be cyclostyled and made into a volume. It is the council's intention to forward one of these volumes to every Young Farmers' Club in the Dominion; the talks should prove of great value, particularly if read and discussed at club meetings.

More Sessions Recommended

In spite of the difficulties mentioned and the cost involved, the Wellington Y.F.C. Council is enthusiastic about its weekly sessions, and is proud to represent agriculture through Station 2ZA, Palmerston North.

I recommend that all Y.F.C. councils give consideration to conducting a radio session through their local station. If this is undertaken, however, it must be resolved to stand behind the broadcast and ensure that it is not just for young farmers; some of the talks should be prepared and presented by Y.F.C. members themselves.

The Wellington Council will be pleased to provide any information required and pass on some of the knowledge gained in sponsoring the weekly Y.F.C. radio session from Station 2ZA, Palmerston North.

—S. G. V. AVERY,
Wellington Y.F.C. Council.

Hill Country Pasture Management

The following article is adapted from a radio broadcast by C. Gavin, Pohangina Valley Young Farmers' Club, in the Y.F.C. Session from 2ZA, Palmerston North.

HILL-COUNTRY management today is a much bigger problem than it was 30 or 35 years ago. The majority of hill farms have been sown down at least 30 years, and the sole of grass has deteriorated a great deal in this time. To get the full value from a farm it must be stocked to its full carrying capacity, and this cannot be done if there is not a good sward of grass. Therefore, the aim of every farmer should be to get his country into first-class order as quickly and cheaply as possible, so that he can work it as a payable grazing proposition. Fern, scrub, and rough growth must be crushed out and then kept down to give the grasses and clovers a chance to establish. On many small farms in the early days, owing to the small returns from stock, farmers often cut newly-sown-down paddocks for grass seed, and this, no doubt, had the effect of thinning out the pasture and allowing much rubbishy growth to prevail.

Small Paddocks

The first essential in controlling and grazing hill country is to have the farm divided into reasonably small paddocks. On a farm of 500 to 1,000 acres paddocks should not be much larger than 75 to 100 acres. Of course, if the country is broken and rough, to have the paddocks so small would be far too costly, as fencing is very expensive. Good timber posts are nearly impossible to get, and cement or iron posts may have to be used in future. On hill country cement posts are fairly heavy to handle, but as they are lasting, they should pay in the long run.

It is very important to have every paddock on the farm well watered, as stock, if they are to do well, must have a plentiful supply of water. On a farm that is not well watered dams might be built in convenient places; to get the full benefit from a dam it should be fenced in and the water piped off to troughs. Many people make the mistake of planting trees round a dam; in very dry weather a dam with trees around will always go dry first.

Pasture Improvement

There are two main ways of improving the pasture. One is by heavy farming of cattle, which is sometimes referred to as hoof topdressing, and the other is by the use of artificial manures. A combination of both would give the best results, as cattle are necessary to keep the feed down where fertilisers are used. The cattle consolidate the ground and tramp out fern and other rough growth. The number of cattle to be carried varies according to the class of country, but a beast to every 5 acres would be about the average, and with the farm divided into small paddocks it is a very easy matter to crush any particular one as required. Once a paddock has been cleaned up it must be kept grazed down, as if fern and other rubbish are not suppressed, it may take another two or three years to get the place back in good order. Sheep must be run in among cattle when crushing a paddock, because they eat the short sweet feed and so force the cattle into the rougher growth. The difference between farms which run plenty of cattle and those that do not is very evident. On one hand are clean, well-grazed paddocks, and on the other fern, bidi bidi, and rough grass.

Sometimes the only way for a farmer to get rid of bad patches of scrub on his land is to have it cut and burnt. The best time to do this is in February or March and the burnt places can then be sown down in good grasses. Occasionally, too, one or two small patches of fern have to be burnt, but it does not generally pay to put a fire through fern, as it is inclined to bake the soil too much. It may seem the easiest way, and there may be good results for a time, but the grasses never seem to establish properly and the fern will always come back worse than ever.

Many farmers today are sowing a light quantity of subterranean clover on bare faces and slips, with good results. The usual amount sown is 3 to 4lb. per acre; it is essential to give country so treated a topdressing with superphosphate.

Topdressing

Artificial manure is mainly used on hill country to stimulate the growth of English grasses and clover, which in many cases have practically disappeared, and the proper grazing of sheep and cattle in conjunction with this process has more than doubled the carrying capacity on many farms. Most hill country has a certain percentage of lime in the soil, and superphosphate seems to be the most popular manure today. It certainly is the easiest to handle. Lime mixed with superphosphate in the proportion of two to one is also a popular sowing, but the cost of transport from the railway and distribution on the average hill farm is too expensive, as 4 to 5cwt. per acre must be sown to be effective. A good plan would be to topdress about one-third of the farm each autumn, the whole area being covered in three years. Some farmers who can afford to topdress their paddocks every second year no doubt get better results, but where capital is not available every third year would prove satisfactory.

The average cost of a dressing of approximately 3cwt. per acre of superphosphate would vary from 17/6 to 25/-, according to the type of country.

On most steep hill country the manure generally has to be packed on horses to the men sowing. However, on easier country much double handling can be avoided by forming rough roads along the ridges and good sledge tracks so that the manure can be dumped in central positions. A good man will sow 1½ to 2 tons per day by hand if it is kept up to him. One thing a farmer must insist on is that the manure be evenly distributed.

The popular time for hill topdressing is March or April so as to get a good autumn growth and to get the manure out before the wet weather sets in.

Farming today, especially on hill country, is regarded by many people as very much of a gamble. Actually, prospects were never better for the primary producer. With markets overseas clamouring for increased production, and with Europe and Asia on a starvation ration, a ready outlet is guaranteed for all that can be produced. Much of this certainly applies more to the cereal grower and the farmer of the better-class land, but the hill-country farmer, too, has his part to play. Success for him depends on hard work and good management. Foot and saddle replace the tractor and truck. Constant supervision of large areas of comparatively lightly-stocked pasture demands long hours and keen judgment. As a grazing proposition his farm can give comparatively high production with a correspondingly satisfactory monetary return.

Welcome Bay Club's Concert

TO raise funds for the National Y.F.C. Memorial the Welcome Bay Young Farmers' Club recently held a concert in the Papamoa Hall. A bright and varied programme was warmly received by an audience of over 200.

The programme was as follows: "The Gay Nineties," song in full costume by club members and members of the Papamoa Women's Institute, who also closed the programme with a nigger minstrel show in full costume; songs and duets by Mr. and Mrs. Davis Clark; violin solos by Mr. S. Peterson, accompanied by Mrs. Peterson; sketch by members of the Te Puna Y.F.C., "The Intricate Operation"; elocution items by Mrs. Slow and Miss Evelyn Dickson; children's item by the pupils of Miss Dickson. the accompanist being Miss M. Pevreal; solos by Mr. John Wright, Mrs. R. Cleavy, and Mr. Guyan Guinness; duet by Mrs. E. Young and Miss D. Carter.

After the concert the club chairman, J. R. Wright, thanked all who had helped to make the evening a success. Supper was served and dancing followed to music supplied by Mrs. R. Cleavy, Miss Pevreal, and Messrs. K. Janson and J. Wright. As a result of the activity the National Y.F.C. Memorial Fund will benefit to the extent of approximately £18.

—J. R. WRIGHT, chairman,
Welcome Bay Y.F.C.

Eastern Bay of Plenty Stock Judging

OVER 100 Y.F.C. members and about 20 farmer friends were present at the recent stock-judging field day held on the property of Mr. J. S. Rae, Opouriao. All clubs in the Eastern Bay of Plenty were well represented, with the exception of Opotiki Y.F.C., which was unable to send any competitors.

Messrs. J. S. Rae and Jim Rae acted as judges and marked the 50 cards that were completed and handed in. Four dairy cows were judged, and the contest was on an individual and a club team basis. Before judging began a demonstration was given on a dairy cow by Mr. J. S. Rae. The inter-club contest was won by Taneatua, which has only recently been revived. The other placings were: Waimana, 2; Thornton, 3; Opotiki District High School, 4; Whakatane District High School, 5.

The team selected to represent the Eastern Bay against the Western Bay of Plenty for the Wright Stephenson Challenge Cup was chosen from the highest individual scoring cards, and consists of the following: A. Wardlaw (Taneatua Y.F.C.), Dick White (Waimana Y.F.C.), and R. Hill (Taneatua Y.F.C.). The inter-district competition will be held in the Western Bay of Plenty this year on a date to be decided. The Wright Stephenson Challenge Cup contest is confined to the judging of dairy cows, but there will also be a demonstration on sheep. Eastern Bay of Plenty members wish their team every success and trust that they will bring back the cup from the other end of the bay.

—E. R. MARRYATT, District Y.F.C. Secretary, Whakatane.

Paengaroa Club's Field Day

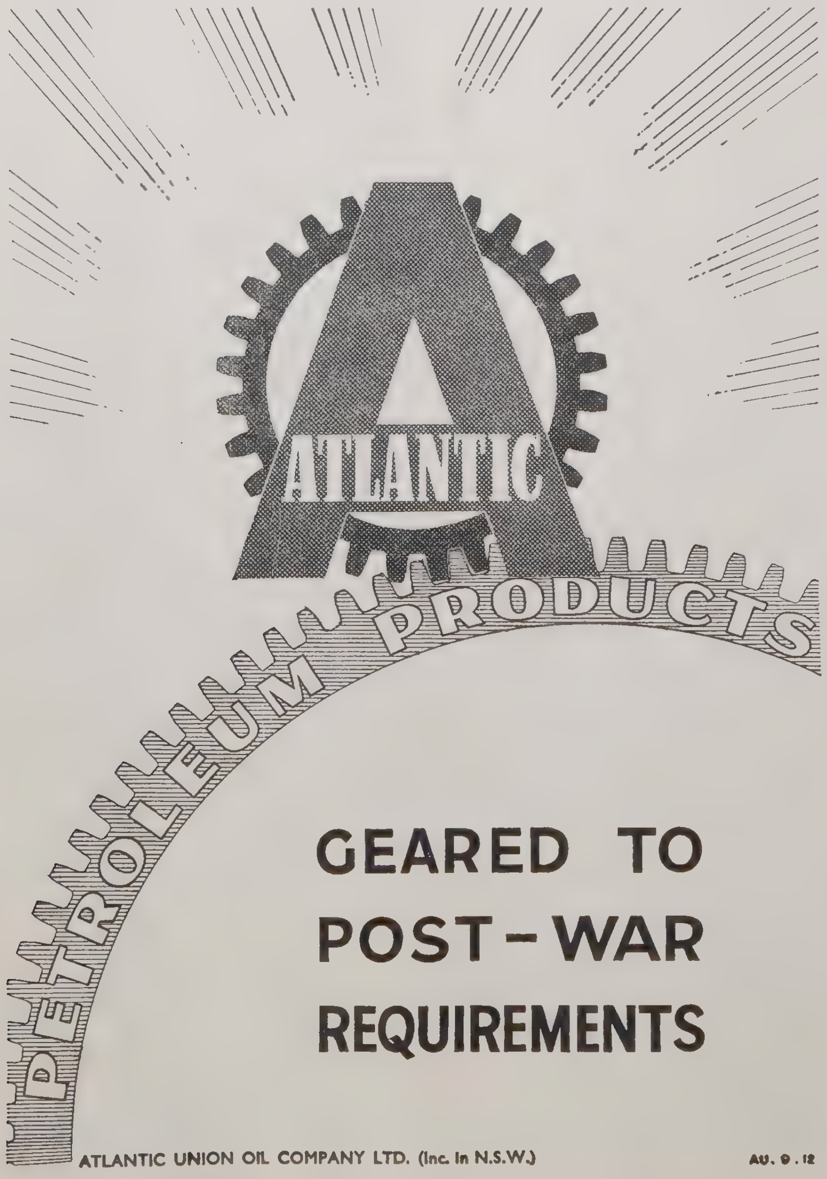
AN enjoyable and instructive field day held recently by the Paengaroa Club on Mr. L. Page's farm was well attended by members and interested farmers. Stock judging—dairy cattle, sheep, and pigs—was followed by demonstrations on each class of animal.

The results of the stock judging were as follows: Dairy cattle—A. Walters, 1; D. Ross, 2; B. Vant, 3. Pigs—A. Walters, 1; W. Marshall, 2; K. Conway, 3. Sheep—W. Marshall, 1; R. Blaymires, 2; J. Rhodes, 3.

After the judging Mr. Bennett placed the dairy cows in their order of merit, and gave his reasons by demonstrating the good points and the faults of each animal. Mr. Barwell, who judged the pigs, illustrated with the aid of drawings the type of pig for present-day bacon requirements, and stressed the importance of careful selection of sows and boars for breeding. A demonstration was also given by Mr. Johnson on the sheep. After afternoon tea had been served Mr. J. Evans demonstrated on a horse, giving the points to be watched when buying, and also the treatment of common ailments.

At the conclusion of the field day the club chairman, I. D. Spratt, extended the thanks of the club members to Mrs. Page, who had provided afternoon tea, and to Mr. Page for the interest he had shown in the club by making his property and stock available; he also thanked the demonstrators for their contribution to the success of the field day.

—Paengaroa Club Reporter.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Lecture Brevities

SEEDS: MR. H. deO. CHAMBERLAIN

THE science of saving seed, Mr. H. deO. Chamberlain told the Marton Club recently, is the most ancient in the world; wheat found in the caves of the cavemen milled quite well, proving that the cavemen knew quite a lot about saving seeds. Mr. Chamberlain dealt especially with grass seeds, for the export of good grass seed is very important to New Zealand at present. Great Britain has recognised the superiority of our seeds, and as high a standard as possible must be maintained.

Grass is an expensive crop to grow; too many farmers are apt to leave a pasture down as long as possible, not recognising that the weed content is rising and the value of their product is falling each year. Goosegrass is a very common weed in ryegrass, and farmers who are naturally anxious to obtain as much as they can will not, as a rule, admit that a paddock is past the bearing of high-quality seed. Certification, while ensuring that the weed content is limited, does not mean that seed is weed free; but it has been tightened till a reasonable standard has been reached. As dressing is costly, and often not very successful, it pays farmers to see that seed harvested is worth harvesting. For instance, if .1 per cent. of Californian thistle, ragwort, and oxe-eye daisy is present in ryegrass seed sown at 30lb. per acre, 15,000, 30,000, and 50,000 seeds per acre of those weeds respectively will be sown. Even if this quantity were reduced by 100 to .001 per cent., the resulting number of weed plants is still very considerable. To maintain our export trade we must produce basically pure seed.

Buyers should inspect the purity and germination certificate covering the seed purchased, and see that the record is not more than three to four months old at the most. Particular note should be taken of the germination on the certificate. The total is given for the maximum germination over 14 days, but as these figures are based on laboratory tests where the very best germination conditions obtain, the germination for the first 7 days is the best approximate guide to results in the field, where more often than not conditions are adverse to germination. Buyers should also make sure of the weed content and see that there is no appreciable amount of such weeds as Californian thistle, the convolvulus group, or ragwort.

The valuation of a line of seed is computed by multiplying the purity by the germination and dividing it by 100.

Mixtures that do not hold should be avoided; for instance, a pasture to be heavily and closely grazed by sheep should not contain cocksfoot, which cannot stand the sun on its crown, but needs plenty of cover, and is all right if the paddock is to be left for hay, when the grass will provide its own cover.

A trouble often experienced in the early stages of establishment of a pasture is a lack of clover, usually attributable to insufficient cultivation to produce a firm seed-bed, which is **not** produced by rolling, but by frequent cultivation with tined implements to sift the small particles between the larger ones and so fill in air spaces. In this way consolidation is secured, and the roller can then be used. Because grass is such an expensive crop, it pays to give it the best possible seed-bed, and no pains should be spared to obtain this.

Mr. Chamberlain said that the basis of the export trade in grass seed rests on the quality of seed produced on the farm. Really dirty seed cannot be cleaned by machines, and farmers should see that lines contain the minimum of weeds and certainly no noxious weeds. The 7 days' germination should be relatively high, and the mixture sown suitable for the purposes for which the pasture is required; finally the seed-bed should be worthy of the seed to be put in it.

—MALCOLM F. GRAY, hon. secretary,
Marton Y.F.C.

Reports on Club Activities

WESTERN SOUTHLAND

Otautau.—Newly-formed club. Officers elected: Advisory president, Mr. J. D. Clouston; chairman, R. L. Healey; secretary and treasurer, R. A. Simpson. Twenty-four present at initial meeting.

South Hillend.—Discussion on report and accounts of annual ball. New members enrolled. Report of district committee meeting. Arrangements for a further club debate. Short talks by club members:—R. Clearwater ("Servicing of Farm Tractors") and M. S. Wilson ("Diesel Engines"). Attendance of 17 members out of 24.

SOUTH OTAGO

Te Houka.—Arrangements for a fat lamb competition. Address by Mr. G. Anderson, of Stirling, on "Life in Fiji"; among other matters of interest the speaker dealt with the crops grown on the island. Seven members present out of 19. At previous meetings speakers were Mr. Ogilvy ("Beekeeping") and Mr. L. West ("Preparation of the Wool Clip in the Shed"). Attendances of 10 and 16 respectively.

DUNEDIN

Palmerston.—Club field day at Bushey Park. Demonstrations and addresses included the following: "Corriedale and Southdown Sheep" (Mr. A. Twaddle, Bushey); "Animal Breeding" (Mr. Stevens, Lincoln College); "The Y.F.C. Movement, Organisation and General" (Messrs. Gow and Elliott, Department of Agriculture); "Dairy Cows and Beef Shorthorns" (Messrs. Wright and Stevens); "Pastures and Certified Seeds" (Mr. Calder, Lincoln College); "Potatoes" (Mr. R. Lobb, Dept. of Agriculture); "Horticulture" (Mr. Crawford); "Pigs" (Messrs. Jones and Stevens). There was an attendance of 16 club members, 6 visiting members, and 70 farmer friends.

NELSON

Tapawera.—Debate to be held, "That Tractors are More Payable than Horses"; leaders selected, A. Eden (affirmative) and H. Lenemor (negative). Impromptu speeches were given as follows: "Shearing and Grinding of the Gear" (B. Hodgkinson); "The Trip to Nelson Freezing Works" (J. Crimp); "Kiln Drying of Tobacco" (M. Savage). Attendance of 11 out of 14.

MANAWATU

Bunnythorpe.—J. O'Brien and R. Capill appointed to deliver the club's broadcast in the Y.F.C. session from Station 2ZA, Palmerston North. Address by Mr. Spring, of Palmerston North, on "Taxation and Farm Finance." Attendance of eight members out of 20.

Colyton.—Arrangements for field day at freezing works. Appointment of delegates to attend meeting at Palmerston North. Two general discussions took place on the following subjects: (1) "How to Mother a Lamb"; (2) "Best Greenfeed for Dairy Cows in the Autumn." Members were asked to speak for at least two minutes. Eighteen members present out of 24.

Kimbolton-Kiwitea.—Report on meeting at Palmerston North during a visit by the Minister of Agriculture. Report on cricket match against Kimbolton Cricket Club. Address by Mr. H. Rutherford on "Sheep Farm Management." Attendance of 11 members out of 24.

Pohangina Valley.—Chairman notified members of Porker and Baconer Competition and supplied pamphlets detailing conditions, etc. Decided to hold the annual dance, final arrangements to be made later. Discussion on the holding of a club picnic; committee appointed (J. Gavin, V. Sinclair, H. MacDonald, R. Passey, and J. Howell) to finalise arrangements. The chairman congratulated A. MacDonald on his successes in the C.W.S. fat lamb competition; MacDonald gained first place in practically every class, winning for the club the C.W.S. Shield, while C. Gavin secured second place with his entries. An interesting lecture was given by a local resident, Mr. McNabb, on "The Establishment of a Small Apiary." Fourteen members present out of total of 28.

Rangiotu.—Arrangements for club show to be held in April in the old Rangiotu school grounds, the horse events to be held in Mr. Hill's front paddock; printed programmes to be distributed. A field day on "Working Dogs" was held on Mr. H. J. Waller's property; afternoon tea provided by Mrs. Waller. Fourteen present out of 16.

Rongotea.—One new member enrolled. Series of films exhibited by Mr. Fraser, of Palmerston North, dealing with "Farming in the U.S.A." and "The Building of the Boulder Dam." Twenty-six members present out of 50.

Whakarongo.—Welcome extended to S. Spall, a returned serviceman. Report by the chairman on the recent meeting of the Wellington Council. A list of returned servicemen was compiled and arrangements made for a welcome home social in the near future. Prepared talks by members: "Tobacco Farming in the South Island" (R. Hodgson), and "The Difficulties of Compiling Short Prepared Talks" (D. Clark). Attendance of 18 out of 29.

SOUTH TARANAKI

Pihama.—Decided to open a current banking account. R. Corkill and K. Julian appointed trustees. Arrangements for a visit to the Waitara freezing works. Two teams selected to debate at the next meeting "That Country Life is Better than Town Life." Address on "Seeds" by Mr. P. J. Oakley, of Hawera. Attendance of 15 members out of 20.

CENTRAL TARANAKI

Toko.—Two new members enrolled. H. Ancell appointed chairman, in place of R. Anderson, resigned. Report by H. Milne (secretary) on the recent meeting of the North Taranaki District Committee. Decided to assist the W.D.F.U. with their annual sports. Talk by Mr. R. Grierson on "The Training of Sheep Dogs." Twenty-two present out of 31.

NORTH TARANAKI

Inglewood.—Recently revived. Officers elected at initial meeting: Advisory president, Mr. F. S. Burson; chairman, T. V. McIntyre; secretary, H. Clough; treasurer, J. Kuklinski.

Karawaka.—Arrangements for annual meeting. Talk by L. McCaul, a club member, on his visit to Canada and the U.S.A. as a member of the R.N.Z.A.F. Attendance of 8 members out of 15.

Oakura.—Arrangements for annual meeting. Dance to be held to attract new members and raise funds. Lecture by Mr. Knowles, advisory officer, N.Z. Dairy Board, on "Herd Improvement by the Use of the Sire." Eight members present out of 10.

Rahotu.—Business meeting. Report of recent dance; profit of £2 4s. 1d. Preliminary arrangements for a visit to the Waitara freezing works. Attendance of 9 out of 13.

Tikorangi.—Club debate, "Which is the Better to Feed with Hay—Silage or Root Crops?" Speakers: M. Smart, C. Smart, F. Furze, E. Soffe (root crops); V. Sarten, A. Hine, C. Furze, M. Foreman (silage). Mr. P. G. Sarten acted as judge, and gave the decision to the team favouring silage. Attendance of eight members out of 11.

WANGANUI

Marton.—Letter from the Wymeswold Y.F.C., England, read and discussed; members interested to learn details of working of the English organisation. Chairman thanked all who had assisted with the recent sports meeting. Secretary instructed to write letters of thanks to the outsiders who had helped. The activity, which was run to raise funds for the Y.F.C. National Memorial, showed a profit of £100 18s. 10d. Decided that in future the sports to be run by a combined committee of the club and older members of the district, under the chairmanship of Mr. Duncan. Visit to a wool store to be arranged. Lecture by Mr. H. deO. Chamberlain, Department of Agriculture, on "Seeds." Nineteen members present out of 44.

Waimarino.—Discussion on the formation of a new club, by dividing up the district; Mr. S. G. V. Avery to be asked to assist at next meeting. Visit to be arranged to the Wanganui meat works. A stock-judging field day to be held at Raetihi. Attendance of 28 (including 7 returned members) out of 33.

SOUTHERN HAWKE'S BAY

Ballance.—Visit to Longburn freezing works to be arranged. Address by Mr. H. C. Wilton, recently returned from overseas, on "Impressions of Italy." The speaker explained fully the methods adopted by the Italian peasants in managing their farms, which were often no more than 4 or 5 acres in extent. Fourteen members present out of 26.

NORTHERN HAWKE'S BAY

Wairoa.—Address by Mr. Newell, manager of the Union Bank of Australia, Wairoa, on "Banking Principles and the Correct Method of Writing Cheques." Eleven members present out of 57; poor attendance due to continued dry spell, members finding difficulty in leaving farms because of danger of fires.

POVERTY BAY

Gisborne.—Field day at Manutuke Research Station included talks and demonstrations on pastures and crops and facial eczema (including the bleeding and testing of blood from affected sheep); the demonstrations, etc., were undertaken by Mr. Simpson, the manager of the research station. There was an attendance of 34 members of the club, two visiting members, and 14 farmer friends.

TAUMARUNUI

Kaitieke.—Decided to grant three years' free enrolment to ex-servicemen joining the club. Discussion on Y.F.C. Memorial. A "quiz" was held on matters of common interest to farmers, such as the world's highest price paid for a bull and the gestation period of a cow and a horse, etc. The idea proved most successful; the meeting was split up into two teams, resulting in good competition. Attendance of 11 members out of 18.

Taumarunui.—Club advised that district field day would be held. Following members selected to attend meeting for the formation of the district executive committee: R. Coates, N. Street, H. Rogers, F. Duncan, D. Wood. A short discussion on wool-classing. Fifteen members present out of 29.

WAIKATO

Cambridge.—Decided to donate sum of £1 to the old folks' home (Auckland Provincial Comforts Association). Lecture by Mr. A. Watt, a local farmer, on "Improvisations on the Farm." Eleven members present out of 43.

Hinuera.—Business meeting. Report by delegates to the recent meeting of the district committee at Hamilton. Arrangements for a dance. Discussion on arrangements for a demonstration by Mr. McArthur on the "Breaking-in and Handling of a Horse." Attendance of 21 out of 29.

Ngarua.—Business meeting. Branch of the Country Library Service formed. Entries taken for the inter-club sports to be held at Springdale. Attendance of 30 out of 48. At the previous meeting a debate was held on "Horses v. Tractors"; the speakers were T. Robertson, R. Presland (horses), B. Kidd, G. Scott (tractors). The decision was given by popular vote, the supporters of the horses winning by a good margin. There was an attendance of 27.

Okoroire.—Field day to be held at St. Peter's School. Discussion on Porker and Baconer Competition. Team to be entered in the local swimming carnival. The meeting was an open one, and several talks were given. Mr. Fitzgerald, the Matamata County engineer, was among the visitors. Attendance of 13 members out of 47.

Springdale.—A small committee from each of the Tahuna, Elstow, Ngarua, and Springdale Clubs met at Springdale to make arrangements and finalise the date for inter-club sports to be held in the Springdale Domain.

Te Awamutu.—Report by C. Eyre, club chairman, on the recent meeting of the Auckland Y.F.C. Council. Messrs. H. Clarke and J. S. Pattison appointed to judge the club's calf competition. Arrangements for annual meeting. Three-minute impromptu speeches by members. Attendance of 30 out of 57.

Te Pahu.—Future of the club discussed. In the past the attendance had been very poor, and it was felt that a general "shake up" all round would be beneficial. A full and frank discussion resulted, the general feeling being that if the club was to continue to function, more young men between the ages of 20 and 30 years must be encouraged to join. A motion to carry on was carried unanimously, members agreeing to contact all young men in the district with a view to securing a good attendance at the annual meeting. There was an attendance of 10 members out of 15.

Waerenga.—Lecture by Mr. Holt on "Bobby Calf Disposal." Twenty-seven members present out of 46.

WESTERN BAY OF PLENTY

Kati Kati.—Decided to enter two teams, a junior and a senior, in the district debating contest. Mr. P. Ramsbotham spoke on his experiences in the North African campaign. Fourteen members present out of 24.

Paengaroa.—Two new members enrolled. Date finalised for annual calf-judging competition. A senior and a junior team to be entered in the district debating contest. Arrangements for annual athletic meeting. The inter-district stock-judging contest, between Eastern and Western Bay of Plenty for the Wright Stephenson Challenge Cup, to be held at Paengaroa. The club decided to volunteer as a body to donate blood to the Tauranga Hospital. Mr. Austin, manager of Pongakawa Valley State Forest, gave a lecture on "Farm Forestry." Attendance of 28 members out of 69; two visitors also present.

Tauranga.—Arrangements for a visit to the Horotiu freezing works, Waikato. Both junior and senior debating teams selected. Inter-district sports meeting to be held in Tauranga. Mr. B. Murray gave an address on his experiences in Italy, and spoke at length on his tour of France, Germany, and Austria. Nineteen members present out of total of 34.

Te Puke.—Address by Mr. Haddow, of the Rehabilitation Department, Tauranga, on "The Rehabilitation of Home and Overseas Servicemen." Attendance of 22 out of 38.

Te Puna.—Two teams to be selected for the debating contest. Decided to donate blood to the local hospital. Mr. Strugnel, of the District Pig Council, gave a lecture on "Pig Husbandry," and answered a number of questions. Twelve present out of 24.

Waihi.—Three new members enrolled. Report on meeting of district committee. Lecture on "The Rearing of Pigs" was given by Mr. Davidson. Attendance of 24 members out of 33.

Welcome Bay.—One new member enrolled. Stack-building competition to be held; also a field day on "Ploughing." Arrangements for a dance; dance committee appointed. General discussion on matters of farming interest; topics such as soil erosion and topdressing with liquid manure came up. All members took part. Attendance of 21 out of 35.

EASTERN BAY OF PLENTY

Taneatua. — Recently resumed activities. Officers elected: Advisory president, Mr. G. R. Yeoman; chairman, G. Hill; vice-chairman, R. Oakman; secretary, G. Grey; treasurer, A. Wardlaw. Members attended the district field day, held on Mr. J. Rae's farm, Taneatua, where the club team won the inter-club stock-judging competition, members scoring first and third place among an entry of 50.

Thornton.—Arrangements for a trip to Whale Island. A club debate was held, the subject being "Stripping v. Non-stripping." Speakers: A. Baldock, T. Dodunski, F. Johnstone (stripping); J. Laing, J. Grey, A. Moore (non-stripping). Mr. H. G. Gilmer, field consulting officer, Herd Improvement Association, also spoke on "Stripping and Non-stripping." Attendance of 29 members out of 41.

AUCKLAND

Clevedon.—Six new members enrolled. Dance to be held. Arrangements for a field day at Puketutu Island; also for a cricket match. Lecture by Mr. Watt on "Stock Diseases"; the speaker dealt mainly with T.B., facial eczema, and hydatids. Twenty-five present out of 32.

East Tamaki.—M. J. Green appointed to act as junior judge in the Friesian section at the forthcoming Auckland Show; six other members to act as stewards. Four new members enrolled. Lecture by Mr. H. Woodyear-Smith on "Pastoral Farming of the Future"; the speaker advised members to make use of the soil survey maps that are available, and to apply the fertilisers that are most suitable for their soil types. Attendance of 22 out of total of 41.

Franklin.—Appointment of auditor. Report on recent meeting of the district committee. Chairman announced that Mr. Bevin had presented an Albee to the club; Mr. Bevin to be thanked for his gift. Address by Mr. H. Woodyear-Smith on "Farming in the Pacific Islands"; the speaker stated that the largest single-unit dairy farm in the British Empire was in Fiji, where 1,000 cows were milked by hand on one farm, using native labour. Mr. Woodyear-Smith answered numerous questions on general farming topics. Twenty-eight members present out of 42. At a previous meeting there were 29 members present. A recent dance showed a profit of £45 14s. Mr. A. D. Mercer, Department of Agriculture, gave a lecture on "Commercial Fertilisers."

Karaka.—Address by Mr. N. M. Pryde, manager of the local branch of the Bank of New Zealand, on "Finance." Attendance of 20 members.

Pukekawa.—One new member enrolled. Report by club's memorial committee; recommended that the club reference library be made the club memorial; funds also to be collected for the National Y.F.C. Memorial. Mr. P. O. Brown, retired cream grader, addressed the meeting on "Cream Grading and Feed Flavours." Twenty members present out of 24. A field day was held, members visiting the N.Z. Co-op. Dairy Co.'s butter factory at Tuakau, and the Internal Marketing Division's vegetable processing plant at Pukekohe.

Pukekohe East.—Impromptu speeches: six subjects were written on the blackboard, selected members speaking for or against for three minutes. Address by Mr. R. Sarak, superintendent, Pukekohe St. John Ambulance, on "First Aid to the Injured." Twenty-eight members present out of 47.

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THE GOOD NEIGHBOUR

FAITH

"Faith is the force of life."—Tolstoi.

I HAVE been thinking a good deal about faith. Many of us in the capital city have recently had the privilege of meeting a man whose life is a testimony to the faith that sustained him throughout a terrible ordeal and made him a source of strength to others—Lieutenant-General Sir William Dobbie, former Governor of Malta. We are acquainted with the main facts of the Battle of Malta; we know the strategic value of the island which at the outset of the siege possessed only a limited garrison to hold the 30 miles of beaches, and whose inadequate air defences consisted of 4 fighter planes and 16 out-of-date anti-aircraft guns pitted against the might of the enemy. No reinforcements could be expected for a considerable time, and Malta's dense population was almost entirely dependent on outside sources for food supplies. Insuperable odds, enough to daunt the most stout-hearted Commander-in-Chief. "We did all we possibly could to ensure the security of the fortress. But our reliance was on God," stated General Dobbie simply. And the gallant, hard-pressed inhabitants of that little island withstood over 2,000 bombing attacks in the next 2 years, and the world witnessed a miracle—one that ranks with Dunkirk and the Battle of Britain.

It has been said that the greatest asset of a man, a business, or a nation is faith, and in his book, "A Very Present Help," General Dobbie stresses the point that the strength of a nation is determined by that of its individual members.

> *"It may be a revelation to us to find out how much faith and conduct go together, and how much they react on each other. We find that our faith, and the things of the spirit generally, are not a separate department of our life, isolated from the ordinary everyday life which we live. The two are one."*

A message to hearten us and renew our faith as we brace ourselves to meet the challenge of peace.

Valletta, capital of Malta.

Malta, G.C.

In some major personal disaster—severe illness, loss, or misadventure—we find that so many material things upon which we had hitherto thought our happiness depended no longer matter very much. It is the spiritual realities, intangible, unchanging, to which we turn in extremity. Our days are so crowded. There is so much to be done and we rush from one activity to another (most of them necessary and undoubtedly excellent in themselves), thereby being in danger of losing touch with spiritual forces—"faith and hope and love last on, but the greatest of these is love." Notice, however, that "faith" is the first essential. When we are called on to suffer, to shoulder burdens from which our whole being shrinks, it is then that our belief is truly tested, and a deep-rooted faith gives us strength to overcome our fears, courage to go forward no matter how dark the path:

Faith is a brightness and a shining way;
Faith is a glory that the brave have worn;
Faith is a singing through a long grey day,
Faith is a healing for old hurts long borne . . . .
Faith is the dreams that all hearts know—
The evidence of things that are not seen.
I have not seen it—yet it walks with me;
I have not touched it—yet it holds my hand.
I shall not lose it through eternity,
Whether my journey be by sea or land.
With its high torch to light the alien skies,
I shall face life and death with fearless eyes.

How inarticulate even the most eloquent of us are when we are confronted with the need to reveal those experiences that have touched us very deeply, in order that we may comfort someone who has come to us in distress. It is often a difficult and exhausting process, but the cost is small compared with the benefits bestowed. The Chinese character for "faith" literally interpreted reads "man + word"—a very beautiful conception. Remember it the next time circumstances hinder you from rendering the more obvious forms of service to folks in need. Far be it from me to decry the value of practical aid in time of trouble, but sometimes it is of even greater importance to draw on the unfailing reservoir of spiritual conviction so that some sick or stricken soul may be helped to a happier way of living.

Mary

Break the bones to expose marrow and cut the meat into small pieces.

MAKING SOUPS

By —

EVA TOPPING,

Rural Sociologist, Auckland.

SOUP is a favourite dish for winter meals, and it takes first place on the menu not merely from custom, but because it stimulates the digestive organs, warms the stomach, and prepares it for more solid food.

TASTY and economical soups are easily made if stock is kept ready for use.

Many of the odds and ends of food usually wasted will make excellent stock; trimmings from chops, joints, fish, bacon and poultry, giblets, scraps of cooked meat, bones, and gravy will form a basis for meat stock. Milk, skim-milk, vegetable water, or a mixture of water and milk supply the liquid for cream and vegetable soups made without stock, and which actually are more nutritious than the meat soups.

Vegetable soup, well made, ensures better retention of the vitamins of the fresh vegetables than any other method of cooking them.

Choose a thin soup to precede a substantial dish and a thick soup when light dishes are to follow. Cream vegetable soups are almost a meal in themselves, especially when served with fried sippets. Try not to have the soup of the same flavour as other dishes at a meal; for instance, fish soup should not be served before a fish meal, and cream of tomato soup should not be followed by tomatoes served with the meat.

General Rules for Making Soup Stock

Whether you are making brown or white stock, there are general rules to follow which are common to both. First of all select a suitable saucepan for the stock-pot; enamel-lined or aluminium saucepans are better than tin or unlined iron, but whichever kind is used, the lid **must** fit tightly.

Break bones with a chopper to allow the juices and marrow to escape freely.

Cut any meat into small pieces of 1½ to 2in. in size so that a greater area is exposed, to aid in extracting the juices.

Long, slow cooking in plenty of water is necessary to soften the tissues and dissolve the protein in meat and bones. Quick boiling will toughen the meat and prevent the free flow of juices.

Add diced vegetables of kinds in season.

FOR WINTER MEALS

Cover meat and bones with cold or tepid water and let them stand until the water shows by its colour that some of the juices have been drawn out. The most-used muscles of the animal contain most juice, and for this reason shins, shanks, knuckles, and necks make good soup. Brown stock is made from beef and mutton, white stock from bones and meat of veal or chicken, giblets, and occasionally from rabbit.

To make a supply of stock collect bones and meat scraps, use up all trimmings from joints, chops, cutlets, bacon rinds, gravy, and left-over pieces of roast meat, etc.

Allow 1 quart of water for each 1lb. bones and meat and 1 quart extra.

To give a richer colour and flavour to the stock, part of the meat may be browned in fat, but only a small portion should be done, as frying seals the tissues and makes extraction of the juices less easy.

Put the meat scraps and bones into cold water and let stand about half-an-hour.

Simmer gently for five to six hours without boiling. Allow 2 cloves and 2 to 4 peppercorns, salt to taste, to each quart of water, and for vegetable flavour one carrot, one onion, and a piece of turnip. Remember that turnip and onion are strongly flavoured, so use a small quantity only. *Prepare the vegetables, cut small, and add for the last hour of cooking.*

Allow to cool a little and strain through colander to remove meat, bones, and vegetables. Pour into a large basin and set aside to cool, as stock should never be left in the pot overnight. The fat will rise to the top and set in a cake, which can be easily removed and saved to clarify for use instead of dripping. The stock contains all soluble parts from meat and bone which have been extracted during the cooking and will thicken when cold owing to the gelatin which has been extracted from the bones and gristle. The thickness will depend on the amount and kind of bone used; stock made from beef shins or other part containing much gelatin sets into a jelly. If the stock is cooked at too high a temperature, that is, if it is boiled rapidly instead of simmering, it will not thicken much in cooling, as too high a temperature breaks down the thickening properties of gelatin. When a quantity of stock is made at once it may be found more convenient to cool it in two or three bowls or jars, putting sufficient in each for a day's supply of soup. Cool quickly and keep in a cold place covered with a layer of fat to exclude air. In cold weather the stock will keep fresh for one or two days, but it must be boiled up again on the third day if not required, to prevent it turning sour. If the stock is required for immediate use, allow to stand a while after straining to let the fat rise to the top. Remove as much as possible with a spoon and then draw tissue paper over the surface to take off what cannot be collected in the spoon.

White stock is made in the same way, using veal or poultry instead of red meats and without browning any of the meat.

To Clear Soup Stock

Clear soup is not often required for family meals, but it is useful to know how to treat the stock if you want a clear soup for any special occasion. Lift off all the caked fat carefully and remove what is left by wiping the jellied stock with a clean kitchen cloth wrung out of hot water. Turn the stock into a saucepan; for every quart of stock add the shell and white of one egg, breaking the shell into small pieces and lightly beating the white. Stir constantly over low heat until the stock comes to boiling point, and leave to **simmer only** for twenty minutes. Skim and strain through a clean cloth, heating again before serving.

Soups Without Meat Stock

Soups made without meat stock are made with milk, skim-milk, vegetable water, or a mixture of milk and water, and have pulped vegetables added. Bacon rinds can be used to give extra flavour, and herbs, celery salt, onion juice, and parsley used for seasoning. Thin white sauce is used to bind the liquid and vegetable pulp together, and prevent the thick pulp sinking. Left-over vegetables and those too old and tough to serve with meats are useful for soup. The outer leaves of cabbage, tough sticks and leaves of celery, "woody" carrots and turnips are just as good for flavouring as the more tender parts, and the greener outside leaves of cabbage, celery, cauliflower, and leeks have a higher vitamin content than the hearts.

Cook the vegetables in water until very soft and press through a strainer or colander. Add the pulp to the water in which vegetables were cooked. Add white sauce, previously made, let the whole heat through, and serve with toasted or fried sippets. Make the white sauce in the proportion of 1 tablespoon of flour to 1 cup of milk, adding butter if possible. The soup should have about one-third vegetable pulp to two-thirds white sauce.

Fish soup is made in the same way, using fish instead of vegetable. Put the fish into saucepan and cover with water. Add a peeled onion stuck with four or five cloves, some sprigs of parsley, and a piece of carrot. Simmer gently for 1½ hours. Make white sauce in another saucepan and add the strained fish stock.

STANDARD RECIPE FOR BROWN STOCK

2lb. meat and bones, 1 carrot, thick slice of turnip, 1 onion, ½ teaspoon salt, 3 qts. water, 9 peppercorns, 3 cloves, 3 sprigs of parsley, stalk of celery.

Put meat and bones in water, stand for half an hour. Bring slowly to boiling point. Simmer for 4 to 5 hours closely covered. Add prepared vegetables and cook again for 1 hour until vegetables are tender and bones clear. Strain into basin and set to cool in cold, dry place.

RECIPES FOR SOUP FROM BROWN STOCK

Using the stock as foundation many soups can be made. Here are some variations:—

Kidney Soup:

Add 1lb. kidney, 1 onion, fat to fry, 1 tablespoon cornflour or flour to 3 qts. of brown stock. Remove fat from ox kidney (or similar weight of sheep's kidneys), cut into small squares, dredge with flour. Peel and cut onion and fry with floured kidney in saucepan in a little smoking-hot fat until nicely browned. Add stock, cover and simmer for two to three hours. Mix the cornflour or flour with cold water and add to soup, bring to boiling point before serving.

Brown Vegetable Soup:

Add diced vegetables of any kind available to stock (see illustration top of page 429). Add 1oz. of rice.

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barley, or macaroni to each quart of stock. Simmer until vegetables and cereal are very tender.

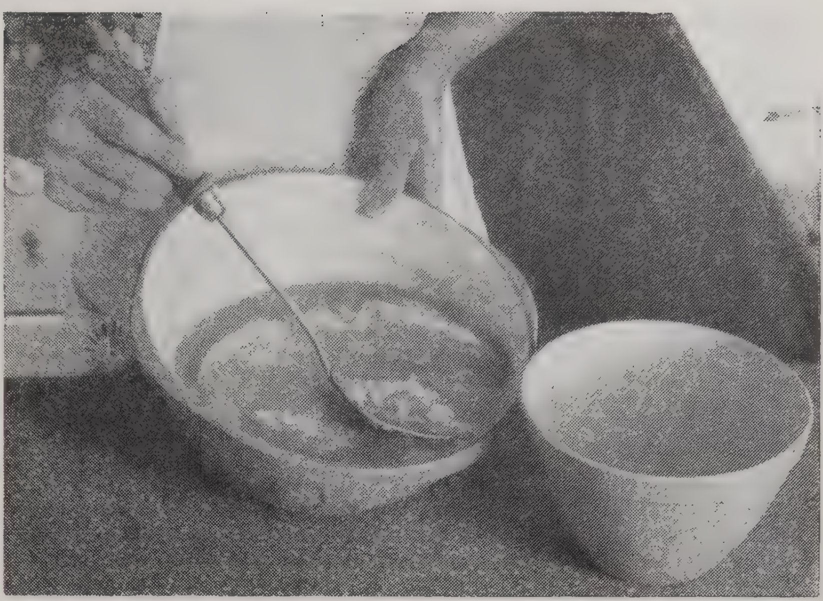
Onion Soup:

Add 1½lb. onions to each quart of stock. Put onions, sliced and cut small, into pan with sufficient dripping to prevent sticking, and fry **with lid on** until onions are quite tender. Add stock, extra salt and pepper, if required, and heat. Half stock and half milk, or skim-milk, makes a variation.

Pea, Bean, or Lentil Soup:

To each quart of stock add 1 cup peas, lentils, or beans, 1 onion, peeled and diced, 1 small swede, diced, 1 carrot, grated, fresh mint for peas and lentils, or parsley for beans. Any bacon rinds or scraps.

Cook until tender, remove bacon bones or rinds, and serve. If beans are used they should be soaked overnight to reduce the cooking time for soup.



Remove the fat and save to use in place of dripping.

Tomato Soup from Bottled Tomatoes:

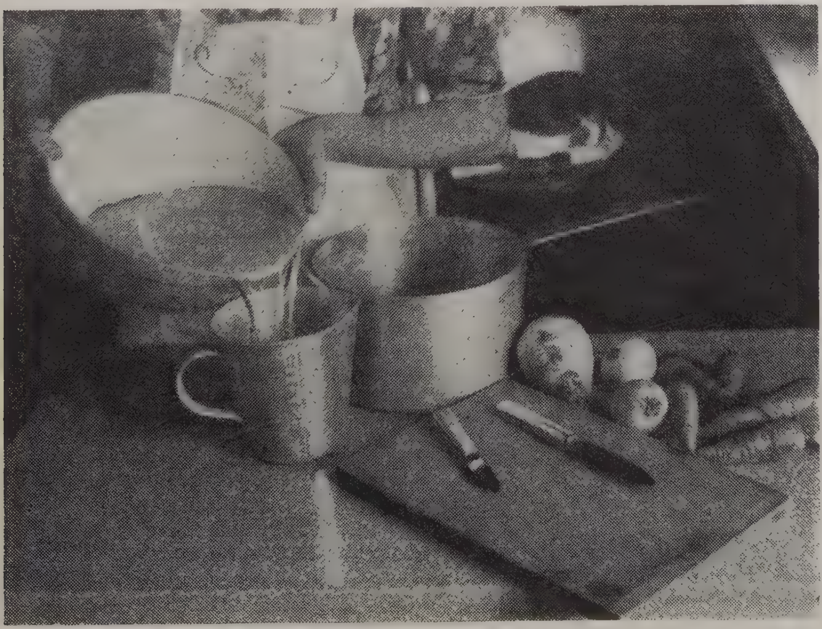
Use 1 pt. jar to 1 qt. stock and add 1 onion, 1 stick celery, bacon scraps, parsley, and thyme. Cook until fresh vegetables are tender, rub through a sieve or colander, return to saucepan, and thicken soup with 1 tablespoon cornflour or flour mixed to smooth paste with cold water.

Standard Recipe for Cream Soups:

4 tablespoons flour, 4 tablespoons butter, 4 cups milk or milk and water, 2 cups vegetable pulp and liquid, salt, pepper, parsley.

Slice vegetables and cook until tender in **just sufficient** salted water. Rub through a sieve. Melt the butter in another saucepan, stir in the flour to blend, add liquid gradually, bring to boiling point. Add the sieved vegetable pulp and liquid and bring to boil.

In these days of butter rationing the sauce will probably be made without butter. Mix the flour to smooth paste with cold milk or water. Boil the remainder of liquid and add the flour paste, stirring well.



Measure required quantity of stock.

Variations:

For **Cream of Carrot** use 2 cups of cooked carrot pulp and liquid, 4 cups of sauce, and a little onion juice. Sprinkle with chopped parsley just before serving.

Cream of Celery—Cut the celery into thin strips and do not pulp. Two cups celery, cook in small quantity of water; use 1 cup celery liquid to 3 cups sauce, and add cooked celery.

Cream soups of **artichoke, onion, swede,** etc., can be made in the same way. Cream of tomato made with preserved tomato pulp is very good, but always put the tomato into the sauce and not the sauce into the tomato or the milk will curdle and spoil the smooth texture of the soup. If the tomatoes are very acid add ½ teaspoon of baking soda to each cup of pulp to neutralise some of the acid and prevent curdling. As an extra precaution it is as well to combine the pulp and sauce at the last moment before serving.

Cream of green pea soup can be made from preserved green peas; add fresh, finely-chopped mint just before serving.

[Photographs in this article are by Sparrow Industrial Pictures, Ltd.

AUTUMN

I saw old Autumn in the misty morn
Stand shadowless like Silence, listening
To silence, for no lonely bird would sing
Into his hollow ear from woods forlorn,
Nor lowly hedge nor solitary thorn—
Shaking his languid locks all dewy bright
With tangled gossamer that fell by night,
Pearling his coronet of golden corn.

—*Thomas Hood.*

GARDEN GOSSIP

I AM beginning to feel very interested in "Tiggetty Boo's" garden. I hope she has had the benefit of the rain recently, as we have. I, too, am endeavouring to make a garden in the wilderness. The former owner assured me that there were plenty of pom-pom dahlias here, but methinks they have departed for another home. All I can find are weeds.

It is time for bulb planting now, and I think it is a miracle what beautiful flowers come from such plain looking bulbs—it rather reminds me of the story of the ugly duckling. It is the same with people: the ones that look somewhat plain and ordinary often make the best friends and companions.

Anyway, here's hoping for more prize-money to replace "Tiggetty Boo's" failures in the plant world. It would be great to have a photo of the garden as it is and then another taken when the plants and shrubs are in full flower. So far, mine are still in seed packets and nursery catalogues, but I am looking forward to the spring, and the barren ground of winter holds much promise for me.—**"Double Dee," Tuakau.**

LIKE "Aranui," I am a great lover of fuchsias. Now that I've a home of my own I want to make a nice garden and obtain collections of various flowers.—**"B.J.B.," Waikato.**

I LOVE seeing masses of carnations in bloom. We have red, pink, and white ones, also striped pink ones. I like them all, but the white ones with the deep red stripes are my favourites. **—"Bella Rob," Putaruru.**

RECENTLY our five months' drought broke, and wasn't it lovely to hear rain pattering down. Yesterday it poured and thundered in great style, and a howling southerly blew up last night, so that today we are back to winter. After so many months of extreme heat the sudden change is rather bewildering. Already the lawns which have been like bare earth are beginning to show a faint green, and dying plants are lifting up their heads. I had planned to have such a lovely autumn garden, but even the dahlias are dead and usually one has such a glorious show at this time. **—"Alix," Wairoa.**

MY garden is suffering badly. I can water only the most important plants and hope for rain. Gardening in this drought is a sorry business, but I am looking forward already to next planting season and am ordering plants and bulbs in readiness. Such is the faith of gardeners. We seem to stand up to many disappointments and struggle on with visions of one day owning the garden of our dreams, with never a wandering cow, destructive hen, or any other pest to destroy its hard-won beauty.

My *Viburnum Burkwoodii* has sweetly-scented flowers in winter, but no berries. There are about 20 different kinds of viburnums listed and many of them do not have berries. Yours sounds very like *V. japonicum*—it has clusters of bright red berries following after the fragrant white flowers. The old-fashioned guelder rose or snowball tree is a viburnum and has lovely tinted leaves in autumn. **—"Vista," Waikato.**

THE HARVEST

We have sown our fields with strange, immortal grain . . .
With bitter toil, for six long, darkened years
We sowed the seeds of sacrifice and pain,
Of hopeful courage, when all hope seemed vain,
Watering them with our lifeblood and our tears.

We have sown our fields—but seed within the earth
Comes not at once to harvest. There must be
Patience and care, to tend the struggling birth,
To guide the tender growth to its true worth
Of fruitfulness—to set its fullness free.

There must be rain and sunshine, storm and cold,
And constant toil lest weeds should choke the grain . . .
And hearts are weary for the harvest gold,
As tempests gather and the years grow old,
And still we labour on with little gain.

But we have courage still and faith to dare
The waiting and the weariness and strife,
Knowing the deathless seeds we sowed must bear
At last the fruitful ear, and everywhere
The blood-strewn fields shall yield the harvest, Life!

—Jean H. Mather.

Books to Read

"FOUR HEDGES," by Clara Leighton: As its title suggests, this book is about gardens and gardening. It is beautifully illustrated with woodcuts by the author, making it a pleasure to look at as well as to read. She writes feelingly of the gardener's disappointments and joys as she sets out to create something worthwhile out of unpromising chalky soil.

"MRS. MINIVER," by Jan Struther: This book comprises a series of short articles dealing with the lives of the Miniver family. Some of these episodes contain some beautiful phrasing and many of the events described have happened in most families. The thrill of Christmas, school holidays, a picnic, a shopping expedition, and lastly, a visit to the dentist, are all related with a humorous touch.—**"Alison Grey," Tauranga.**

I WAS interested in "Maghie's" paragraph as I, too, have recently had the pleasure of reading "Island Farm" and thoroughly enjoyed it. I wonder if "Maghie" has read the delightful little book, "Gardening's Such Fun," by Elsie K. Morton. It is illustrated with the author's own photographs and I found it both amusing and refreshing.—**"Moss Rose," Marton.**

I HAVE not read any of Fraser Darling's books, "Maghie," but "Island Farm" sounds extremely interesting from your account of it and I'm sure I'd like it. Have you read "Highland Homespun" and "Harvest of the Moor," by Margaret Leigh? These are stories of farming told in a bright manner by a Scotch woman who loves the land and does not mind the hardships that go with it.—**"Vista," Waikato.**

DEATH IS ONLY AN OLD DOOR

Death is only an old door
Set in a garden wall.
On gentle hinges it gives at dusk
When the thrushes call.
Along the lintel are green leaves;
Beyond, the light lies still.
Very willing and weary feet
Go over that sill.
There is nothing to trouble any heart,
Nothing to hurt at all.
Death is only a quiet door
In an old wall.

"My Pen-name"

SO interesting were the stories in connection with "Good Neighbour" pen-names, and so revealing of the personality of the writers, that I wish I could have printed them all. Childhood memories influenced the choice of many a pen-name, and I was pleased to note the predominance of poetical Maori names among the pseudonyms.

"Wild Country," Te Pahu, gained first place, and "Christopher," Poro-o-tarao, was second. Highly commended: "Kaituhi," Wanganui, and "Tiggetty Boo," Kati Kati.

First Prize

"WILD Country"—why have I chosen this pen-name? Not altogether because now, in New Zealand, I am a dweller in the backblocks and feel that I belong there; or because I love to climb the ridges and see the dappled blue of cloud shadows passing across the bush-clad slopes of our mountains, and, in wintry weather, the thin, fine curtain of wind-driven rain sweeping down the valley and clouding and blurring the farms. Not altogether because I love the wild country sounds, the high-pitched bleating of the first lamb (so that my old dog looks up at me with smiling countenance), the crying and whistling of birds, the voices of falling waters pouring and tumbling over limestone boulders, sweeping round shingly points, racing onwards—after heavy rain the air reverberates with the sound.

LATE APPLES

The gardener down past the woods,
His apples were "Wine-of-the-wind,"
Sweeter than that honeycomb
They who thieve from the wild-bee find.

To the leaf-patterned sills and the eaves
In a flock came the birds of the air,
And a scent like a cider-press heavy and rich
Drew the traveller there.

His eyes were the dark colour seen
Of pips that grew black in the core,
In January, February, March,
When the warms were blowing in-shore.

And the orchards, the woods, and the house,
Lay in the late sun's glow
In a summer of red-freighted boughs
With "Wine-of-the-wind" bent low.

—Mary R. Gullery.

The strong, uprising strength of trees, as yet unmenaced by the axe; vines, ferns, and mosses, all the lovely things, large and small, of the bush; a rimu standing sentinel against the valley far below where wind the waters of a creek and the clay track that leads out to the world; the brown bracken slopes of the hill opposite—not only because of all this loveliness do I love wild country, but because of earlier happenings. I remember lying as a child on heather-topped cliffs overlooking the Atlantic—lying there with the scent of the heather in my nostrils, the cry of seabirds above me, and the pulse of the earth beating through my body until earth and birds and child merged and were one. The huge Atlantic swell came in smoothly to crash on the rocks below, sending up high plumes of foam, snow-white against the blue of the sea. Because of the resounding Celtic names of the reefs that rang like a spell—Bradogue, Carrachanaeon, Carrick na Spania (on which the galleon struck); because of loving the wild country of other lands high up where the snow covers deep in winter and thaws in the spring sunshine to leave the alpine meadows almost immediately carpeted with flowers, because of all this, and more, and because of the kinship I have with the land, I call myself "Wild Country."—**"Wild Country," Te Pahu.**

Second Prize

I HAVE chosen "Christopher" as a pen-name because it recalls many happy days spent at an old farmhouse in the heart of Wiltshire, and a kindly old gentleman who invariably said on my departure, "St. Christopher go with you for a safe and pleasant journey," Christopher being the patron saint of travellers. When I first went there it was wintertime, bleak and very cold, and the interior of the house provided a striking contrast with its huge log fires and its air of serenity and old-world charm. Built of stone, the place had originally been a monastery and was reminiscent in many ways of the friary with its huge ovens for baking bread, walls two feet thick, the maze of corridors, and the small stone room behind the massive fireplace.

It is said that when the monks were warned of enemies approaching they secreted all their valuables in this little room and sealed it up. Although many people have sought permission to remove one of the walls, my host would not consent, and so the little room still stands as it did two centuries ago, its secrets intact. On Sundays when the church bells in the village pealed clear and sweet and the last notes quivered away into silence, you could almost hear the measured tread of the friars in the corridors as they answered the call to evening prayer. The high stone walls surrounding the house and the old sundial in the shrubbery were also reminders of the former inhabitants. In the summer these walls were a mass of flowers and fruit, and luscious peaches dropped their yellow-gold heads and mingled with the sweetly-scented honeysuckle.

SCABIOUS TIME

If I were a scabious
In the autumn grass
I'd see with a blue stare
Lovely things pass.

I'd wake in the morning
My face wet with dew,
The field white around me
Till the sun broke through.

Like silver-spun spiders
I'd watch the thistledown
Fly all day past me
Till the sun went down.

I'd hear, if I listened
Very small and low,
Clear through the darkness
The mushrooms grow.

I'd see in a green ring
Fairy feet whirl—
If I were a scabious
And not a little girl.

—Teresa Hooley.

(Sent in by "Tinkle Tinkle," Dunedin).

During the winter the cattle were warmly housed in the stables, the puppies in kennels, the hens had indoor runs, and the old pony munched contentedly at the chaff in his stall. All too soon the words, "St. Christopher go with you" would be ringing in my ears, and as I peered up at fog-enshrouded signposts I was inclined to agree with my host that one needed a guardian on the highways and byways of England. . . .

Now I have an infant son named Christopher and I hope in time that he will take up medicine as a profession and go with ailing people and pilot them safely back to the highway of health.—**"Christopher," Poro-o-tarao.**

Highly Commended

IT was in 1941, the first year of the "Good Neighbour" pages, that I began to write to Mary. Here was a new interest to supplement the radio and books on which I relied greatly for entertainment. The week I wanted to post away my first contribution was a busy one, so choosing a few minutes between jobs I hastened to write out my effort. Because the war news was grave at the time I switched on the radio. I soon became completely engrossed in my writing and didn't notice the news was over till I looked up, wondering what in the world to sign myself. In that brief pause I heard a voice say: "This is Michael Standish interviewing people in the streets of London with a microphone —" and then into the room came the sound of people singing—singing with a challenge, a tenseness in their voices which I could feel even across those thousands of miles.

"Thumbs up and tiggetty boo to you—" to me it seemed as if a pathway of light reached down into my room from that London street. In my mind I could see a group of people with their chins up and backs to the wall, hurling defiance at Hitler as the bombs fell. I've never heard the complete song. Maybe, like other modern ones, it would have little appeal in its entirety. But that day those words rang across the world, a symbol of matchless courage. . . . I picked up my pen and wrote with a quick flourish **"Tiggetty Boo," Kati Kati.**

Highly Commended

A PEN-NAME? To a young writer the very idea of seeing his work under a pen-name is fascinating, and under the disguise he can write all sorts of things to which he would be too reserved to put his name. It reminds me of the fun you can have at a masked ball. Peeping from behind the mask and snugly wrapped in a domino, many a shy lad or lass blossoms into a different being. So with a pen-name. Of course, this hiding one's identity isn't always a matter of diffidence. There are many reasons for doing it, but, thank goodness, the one which forced a woman to call herself "Georges Sand," because only in that way could she get a fair deal from the critics, doesn't apply today.

I remember well how carefully I chose my pen-name. Having a penchant for Maori I sought an old native interpreter. "What term can I use, as there is no such word as write in Maori"? "Kaituhi" was his choice, and a good one it was, for "kai" means food, and "tuhi" one who marks or draws; and there you have it: "one who writes for food." I wrote for food for many years, and still do so.—**"Kaituhi," Wanganui.**

Competitions

MAY

Have you decided on what is the most important social asset? Entries close on May 15.

JUNE

In the ordinary course of reading we all come across quotations—either prose or poetry—which appeal to us particularly. So how about sharing favourite quotations with one another, adding a brief explanation concerning your choice? Entries must not exceed 500 words.

"FAVOURITE QUOTATIONS"

First prize, 10/-; second prize, 5/-. Closing date, June 15.

MARY,
c/o "Journal of Agriculture,"
Box 3004, Wellington.

JONATHAN was my first love. Soon after I first learned to read I happened across the story of David and Jonathan. Of course I knew David was the real centre of the story. Through a power not his own he overcame the giant and rescued a lamb from the mouth of a lion, and was able to play so skilfully upon his harp that he charmed the heart of a king and won the lasting love and devotion of the king's son. Yet somehow it was Jonathan who won my allegiance. I remember reasoning in my childish way that he could so easily have been jealous of David and the place he held in King Saul's household. But Jonathan accepted David as his brother, their souls, we are told, being knit together in love, yet to all intents and purposes David had usurped Jonathan's rightful place.

"Jonathan's love for David was wonderful, passing the love of women." Without understanding anything of the inner meaning of the

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story, I revelled in the sound of the words, and each time I read the story it was the king's son who captivated my imagination. To me, he stood for all that was noble and good and true. Years later, when I found myself wanting a pen-name I naturally thought of my childhood hero.

—"Jonathan," Clarence Bridge.

I TAKE for my pen-name "Butterfly" because as a child catching butterflies was one of my hobbies. I once captured a black grub and put it in a jar and fed it. In a short time it reached the chrysalis stage. One day when I burst in from school, there, in my jar, were two elegant butterflies. Much as I loved them I felt I must let them go. They separated, flew out the window, and away. Thus, to a childhood memory I owe my pen-name.—**"Butterfly," Westport.**

A Child In The Woods

In the woodlands where the acorns tumble
On to brown grasses left from summer days,
A small child in a turquoise frock
Kneels to blow hours from a dandelion clock;
Kneels to gather in eager hands
Nuts and berries and silver strands
Of broken cobwebs, finely spun.
Gathers and drops in her wicker basket
A briar, a chestnut's prickly casket,
Sycamore wings and round crab apples—
(See how the filtering sunlight dapples
Her gold-brown hair and the gold-brown leaves
With coins of light)—now she has found
A plane tree bobbin, paused at the sound
Of a grey bird's calling,
Keen to capture a red leaf falling . . . .
Globes of thistledown in the blue air,
Fragments of laughter everywhere.

—Gweneth Bell.

MY pen-name is "Whare Maunga," which translated literally is the black house or the house on the hill. It was the name of our home for many years and we decided on it from Vachell's book, "Brothers." The brothers were educated at Harrow, the school on the hill near London. Our home was the schoolhouse—friends will probably recognise the name and be interested.

—"Whare Maunga," Auckland.

RUNNING the length of our farm, and dividing the flat part from the hills, is a lovely little creek—Haruru by name. All dairy farmers know the necessity of having good drinking water for their cows and nothing is better than the cool waters of a running stream. To us, it seems the very lifeblood of our farm. Pleasant little Haruru plays its part in helping on production, so what better name could I have chosen for my pen-name?

Flax, totara, birch, rimu, and manuka are dotted along its banks, and the kowhais make a great show in the spring. Haruru was a wonderful help this summer during the dry season. Many happy hours the lads spent playing in it with their boats, building bridges and channels with the stones, learning to swim, and fishing for eels. What a thrill when they landed one! And I, with my knitting, sat relaxed under the shady trees, watching them and dreaming fond dreams.—**"Haruru," Kaukapakapa.**

"CARADON" is my pen-name simply because I love mountains and hills, and it is the name of a hill in the west country of England. Always when signing the name it brings back the beautiful green hill to my mind. Mountains and hills seem to speak of things secure and lasting, sincere and pure. When other things change and pass away they are always there waiting just the same, as if they speak of, and reflect, God, especially in these days of drought when the earth is brown and barren. It seems a singularly appropriate name to use for Mary's pages, as it symbolises the spirit of her "Good Neighbours" in its sincerity and faithfulness.

—"Caradon," Waikato.

A PEN-NAME should fit the user, so I cast round for a Maori name which would reflect my likes and desires and give me pleasure when used. I have always loved the water, spending much of my spare time by sea, lake, or river. Memories of one special holiday came back to me—golden days in the wide spaces of Taupo Moana, the inland sea. Though to see this mother-of-three busily engaged in the everyday tasks of a farmer's wife, you may not exactly recognise me as a water-maiden, yet in my dreams I am really—"Moana."

—"Moana," Taumarunui.

OFTEN when signing my pen-name I have wondered what impression is given to the reader. Does it suggest a dull soul swamped with cares and difficulties, or one who dreams and lives in realms above this world? In fancy I like to think of my name as belonging to one who realises that life has both sunshine and clouds. How monotonous a perpetually clear blue sky would be, for it is the presence of clouds that gives the sky its beauty.—**"Cloudy," Ashburton.**

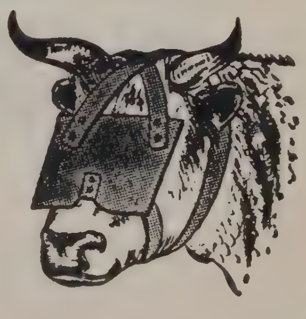
FIRES OF AUTUMN

In fields and valleys, little garden plots,
In wild, high, secret places in the hills,
The fires of autumn warm their glowing hearts,
And, borne on smoky plumes, their fragrance fills
The autumn air like incense, high and sweet,
Where summer's glory burns at Nature's feet.

Gold leaves and brown were heaped upon the fires,
Bracken and fern fed flame and glowing ember.
Soon the grey ashes scatter in the wind,
The smoky eddies die, and we remember
Only the summer's gold, the autumn's red,
Only that spring will come, though they are dead.

If only we could gather from the world
The waste of hurt, the needless pain and strife,
And heap them, as we heap dead summer's leaves,
Upon a blazing autumn fire, would life
Stand forth again refreshed, reborn and clear,
As green spring from the ashes wakes each year?

—Nancy Bruce.



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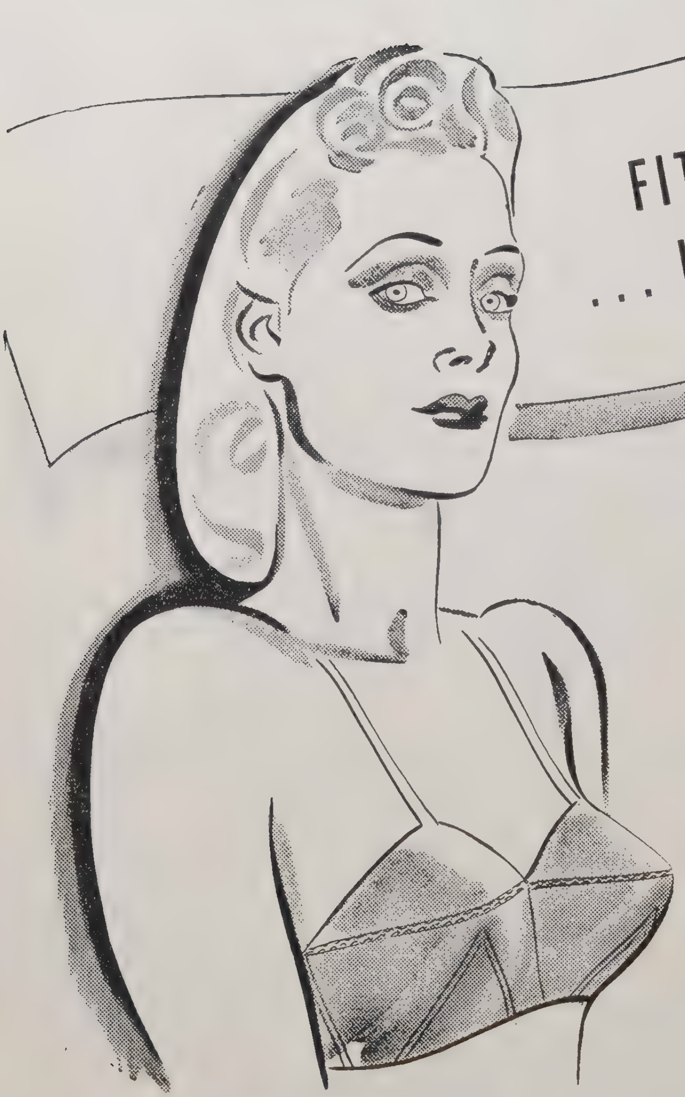

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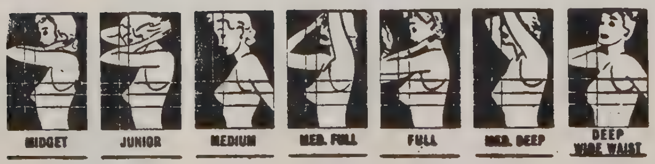

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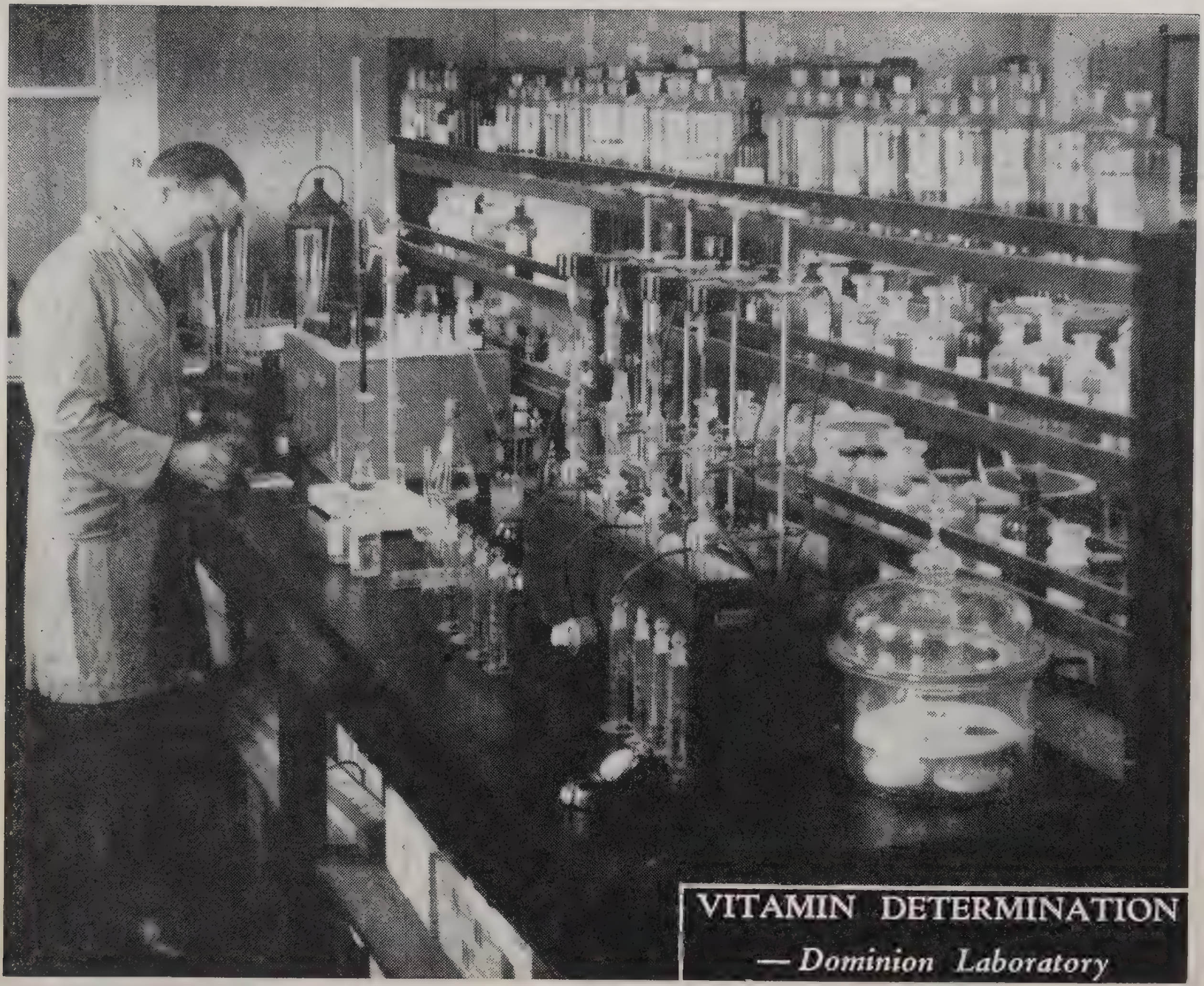

VITAMIN DETERMINATION
—*Dominion Laboratory*

VITAMINS ARE ESSENTIAL FOR HEALTH

THERE is something quite dramatic about the discovery of vitamins and the rapidly-unfolding knowledge of these small, extra food factors which regulate the body processes. The vitamin alphabet has caught the public fancy as has no other factor in nutrition. Vitamins are a twentieth-century discovery, although long before that—two centuries at least—it was known that sailors got scurvy if they were not given fresh food or limejuice; and the housewife insisted on fresh fruit and vegetables in the family diet.

The existence of vitamins was overlooked because the foods people consumed usually provided enough of them to prevent results disastrous to health. Most foods, as supplied by Nature, contain some vitamins; the foods in an ordinary, mixed diet supplement each other in vitamin content. The quantities of these substances in foods is very small. As in the 3lb. or so of foods that we eat in a day we do not take more than $\frac{1}{10}$ gram (about $\frac{1}{284}$oz.) of vitamins, this is the story of the importance of little things.

IN this article, the third of a series on nutrition, Dorothy E. Johnson, Rural Sociologist, Christchurch, deals with vitamins. In the February issue, the writer discussed the calorific values of food rations, and last month she dealt with proteins.

Vitamins should not be confused with bacteria or germs. They are complex, chemical substances in foods which, with one exception, the body cannot make for itself, but which are necessary for normal growth and the maintenance of health. Some are soluble in water and some in fats. Since refined foods have assumed a more prominent place in the diet, ill health due to vitamin deficiencies has become more frequent.

CHIEF SOURCES

Plants make vitamins for us. Their chemical laboratories are in their leaves; sunlight is their source of power. Green, leafy vegetables have a high content of most vitamins, as have the green-growing shoots of plants; seeds such as peas, beans, lentils (the legumes), whole grain cereals, and nuts also have a good content of certain vitamins. Other vegetables and fruits usually contain smaller amounts which vary considerably according to the soil in which they are grown, the stage of ripeness when picked, and the conditions of storage. Animals, in their turn, feed upon the

ISSUED BY THE DEPT. OF HEALTH

SCHOOL LUNCH IS IMPORTANT

Your child's stamina and alertness require the stimulation of a tasty, well-balanced midday meal.

Mothers can provide it by preparing appetising school lunches at home.

Here are the ingredients of a good SCHOOL LUNCH:

- Two or more substantial sandwiches—wholemeal for health, white bread for variety—with fillings of meat, egg, Marmite, Vegemite or other yeast extract, fish, liver, bacon; peas, beans or nuts or cheese alone, or with lettuce.
- One sweet sandwich of dried fruits (dates, raisins, etc.), banana, chopped apple, black currant jam.
- Something to chew after lunch, such as raw fruit or vegetables.
- Milk as a drink—school milk if available—if not, include a bottle from home.

The Department has a Free Booklet with suggestions for school lunches. Write for a copy.

KEEP THIS ANNOUNCEMENT FOR FUTURE REFERENCE 13b

FOR A HEALTHIER NATION

plants and concentrate vitamins in their flesh and especially in certain organs such as the liver and kidneys. Cows and hens put vitamins from their food into milk and the yolks of eggs, thereby providing us with valuable sources of vitamins. But, of course, the vitamin content of eggs and milk varies according to the relative amount of vitamins in livestock feed. In countries where cows are stall-fed on hay and grain in the winter, the vitamin content of butter then is lower than in butter made in summer. New Zealand butter has a high, all-the-year-round vitamin content because, with its mild climate, cows do not have to be shut up at all.

Fish have unlimited quantities of small, green sea plants to eat; they store certain vitamins in their body fat, and especially in their livers. So fish-liver oils are our richest sources of these particular vitamins.

The fat-soluble vitamins are found in liver, butter, and egg yolk, while the water-soluble vitamins are more abundant in vegetable foods and lean meats. Milk contains both.

INDIVIDUAL VITAMINS

Scientists indicated the mysterious but powerful role of these newly-discovered substances, by bestowing on them the name vitamins (vita meaning life) about 1913.

Investigations soon showed that the "fat-soluble A" and "water-soluble B" comprised not one vitamin, but a group of vitamins, each of which had a separate, indispensable function. Originally they were identified by letters, a, b, c, d, k, either in order of their discovery or by the initial letter of some word suggestive of their function. As vitamin B was found to be a group in itself, we have vitamin B1, B2 — B6. Some 25 different vitamins are known, but not all of them have proved essential to man.

The make-up of many is so well understood by chemists that it is possible to separate them from their natural sources in the form of pure crystals; they may also be made or "synthesised" in the laboratory. So instead of letters of the alphabet, they are being given the names that indicate their chemical content—to the expert, that is. They may lose now that subtle combination of the mysterious and the familiar which has contributed to the interest of the general public as well as research workers. Calling them by letters as is still done provides a convenient, abbreviated method of reference. To give up the name vitamin C in favour of "ascorbic acid" and to call vitamin B "thiamin" and vitamin B2 "riboflavin" may be quite a wrench. Other members of the B group are niacin or nicotinic acid, vitamin B6 or pyridoxin and pantothenic acid. The table on this page contains a summary of the principal vitamins and their function in the body; it also lists other nutrients.

MINIMUM REQUIREMENTS

Since vitamins are obtainable as pure substances it is possible to measure them either by "international units" (I.U.) or directly in terms of weight units. With these units it is possible to measure the minimum daily requirements of an individual and the optimum allowances of vitamins. The latter—the standard—are usually several times the former. But people should not run away with the idea that they can produce super-health by ever-increasing quantities of vitamins.

A recent experiment was made in America to test the effect of specific dosages of the various vitamins on a group of healthy adults of good nutritional status or bodily condition. These were given in addition to their normal and good intake of food. No difference in their health resulted.

USES IN THE BODY

While one vitamin cannot take the place of another, vitamins share in certain functions as a group of body regulators. Dr. Bogert summarises their functions as follows:

1. **The promotion of growth;**
2. **The promotion of the ability to reproduce healthy offspring;**
3. **The maintenance of health and vigour through promoting—**
   - (a) **the normal working of the digestive tract;**
   - (b) **normal nutrition;**
   - (c) **health of the tissues; and**
   - (d) **resistance to bacterial infections.**

"When several vitamins participate in promoting some function of the body, lack of any **one** of them will suffice to inhibit that function. . . . . For example, vitamins A, B1, B2, C, and D all have a direct influence in stimulating growth. When any one of these vitamins is in short supply, growth will be stunted, even though the food contains plenty of the other vitamins needed for growth."

NATURE'S MIXTURES

The chief aim of vitamin study is to find out how to get plenty of all the vitamins necessary for positive health. A well-chosen diet of natural foods is best for normal people. The need starts before birth and continues throughout life. Vitamin concentrates or tablets are valuable in special cases—under a doctor's supervision. Unfortunately, the work vitamins accomplish is often shown by the ill effects caused through lack of them.

By suggestion, people wonder whether their ailments result from vitamin starvation. This is sensible if it prompts people to correct their food intake, for the relative proportions of Nature's mixtures promote health better than chemists' tablets.

WHAT THE DAY'S FOOD SHOULD PROVIDE AND WHY.

DIETARY ESSENTIALS.	WHAT DIETARY ESSENTIALS DO FOR THE BODY.
Proteins:	Build and repair muscles, glands, blood, and other tissues. Furnish material for substances that regulate body processes. Furnish energy for bodily activities.
Mineral Elements:	
Calcium and phosphorus	Build and maintain teeth and bones. Constitute part of muscle and nerve tissue and of body fluids.
Iron	Constitutes part of red blood cells which carry oxygen to all parts of body.
Iodine	Constitutes part of thyroid gland, which regulates rate at which energy is used by body.
	(Copper, magnesium, manganese, potassium, sodium. and other mineral elements are also essential; they are probably present in adequate amounts in diets that supply plenty of calcium, phosphorus, iron, and iodine).
Vitamins:	
Vitamin A	Is essential to tissues that cover and line body and help it to resist infection. Takes part in adaptation of eye to dim light.
Thiamin (vitamin B)	Each takes a specific part
Riboflavin (vitamin B2)	in process by which foods
Nicotinic acid	are burned in body.
Ascorbic acid (vitamin C)	Is essential to health of teeth, bones, blood vessels, and other tissues.
Vitamin D	Helps body to use calcium and phosphorus in food.
Carbohydrates:	
Starch	Furnish energy for work.
Sugar	
Fats:	
Fats and oils	Furnish energy for work. Give staying power to meals. Provide fatty acids essential to health.

Most practical rule for increasing the vitamin content of the diet is to take larger amounts of whole milk, whole grains, fruits, and vegetables along with some butter, eggs, and meat—especially liver and kidney. The National Research Council, in 1941, suggested the following:—

Milk: 2 or more glasses daily for adults—3 or 4 for children.

Vegetables: 2 or more servings daily besides potato; 1 raw; green and yellow ones often.

Fruits: 2 or more servings daily—orange or lemon or tomato.

Eggs: 3 to 5 a week. 1 daily preferred.

Meat, cheese, fish, or legumes: 1 or more servings daily.

Cereal or bread: Whole grain (most of it).

Butter: 2 or more tablespoons daily.

Other foods will be needed to supply calories, but with the foregoing foods each day there will be little danger of vitamin shortage. As far as is known all vitamins can be stored in the body to a varying degree. Therefore, the suggestions in the table need not be interpreted rigidly. Some missed one day may be made up within the week. This applies more perhaps to the fat-soluble vitamins than to the water-soluble vitamins, which are easy to consider on a daily basis, as they are derived mainly from fruit and vegetables. From the recommendations of the Research Council it is possible for people to judge the quality of their eating habits from the nutritional aspect.

In handling, storing, and cooking foods containing vitamins care must be exercised. Vitamin B is destroyed when heated in the presence of air; vitamin C is destroyed even more quickly. Both are more stable in the presence of acid and more quickly broken up in the presence of alkali (washing or baking soda). The other vitamins, particularly A and D, survive all reasonable treatment of food. The instability of vitamin C is of great practical importance; it accounted for the prevalence of scurvy in the past among people who had to live on preserved foods. It also drives home to all the paramount place the cultivation of a vegetable garden and orchard must have in the farm economy. The farm home garden is not something to be left to spare time, or done wearily with hand labour at the end of a big day.

Family food needs should be planned with the rest of the crops and grown where farm machinery and the best knowledge and methods can be applied.

Gardening is seldom a hobby to farmers; only a few special things need to grow round the house. It is an anachronism to have the vegetables for the farm house growing round it in a small plot in which a tractor cannot turn round.

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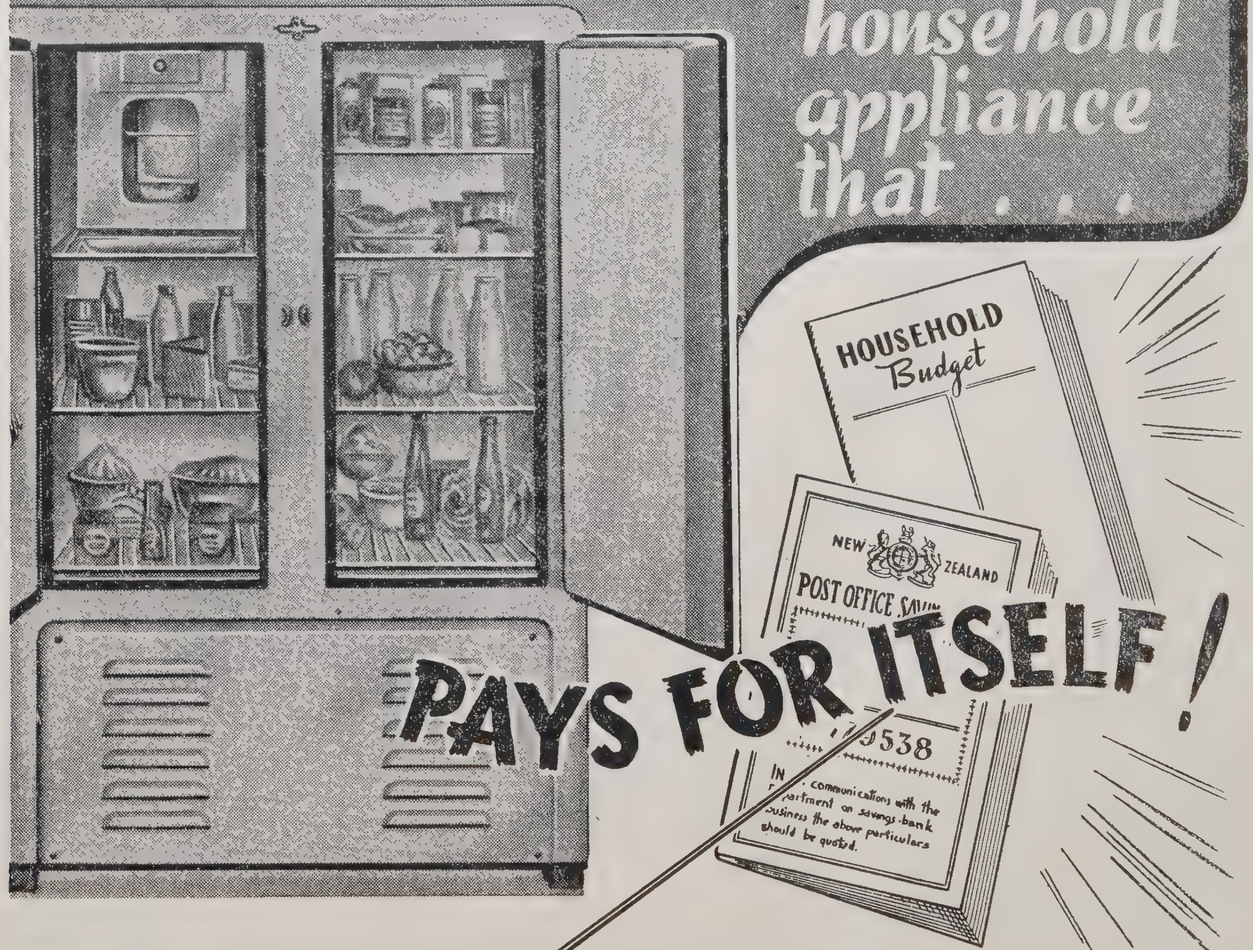
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Lingerie Finishes

By
EVA TOPPING,
Rural Sociologist, Auckland.

LINGERIE materials have been scarce, but once again the shops are showing quite a good selection of very pretty goods in pastel shades, plain and patterned and of various weights. There are sheer silks, triple ninons, artificial crepe de chines, and satins for those "extra special" garments, and voiles, cambrics, prints, and muslins for the "not so specials," all just right for hand sewing attractive underwear.

FINE needles and matching mercerised cotton or sewing silk are a necessity for tiny stitches; narrow hems and seams help to give the finished garments the daintiness which is so attractive and desirable. In underslips, especially, narrow flat seams and carefully-made darts are essential, for all bulkiness must be avoided, as the line of a well-fitting dress can easily be spoilt by "lumpy" under garments.

Seams

Seams for lingerie are usually run-and-fell or French seams and can be made by hand or machine, using a fine needle and small stitch. Either can be machine stitched first and the raw edges trimmed as narrow as possible, and then stitched by hand on the wrong side. In this way long seams will be stronger, but the finished work will have a hand-made look if this is desired. In fine silks, voiles, and sheer materials a seam can be quickly made by the method illustrated in Fig. 1 needing only one row of stitching. Place the two wrong sides together, the uppermost ⅛in. below the other. Turn the under piece over twice and sew along the edge, using running stitches, making a back stitch frequently if sewing by hand. Take care that each stitch goes through the four thicknesses of material.

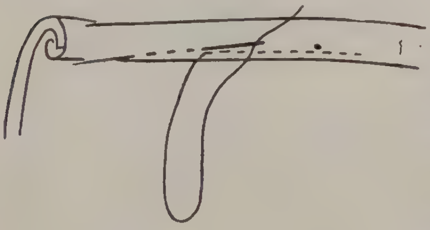


Fig. 1.

When one section of a garment is cut on the cross and is to be joined to a straight piece, keep the bias piece uppermost while stitching and take care not to stretch it. When one seam crosses another, open and press the first seam before stitching the second.

Faggoting Seams

Faggoting is a method of joining which gives a light, dainty appearance to the garment and can be used on curved seams. It is particularly suitable for the bodice seams on slips, nightdresses, and pyjamas, while whole sections of a pattern such as yokes or waistlines can be formed entirely of faggoted strips of materials. To make a faggoted seam, first turn down the raw edge once to the wrong side and stitch either by machine or hand according to individual choice. Crease again just inside the seam line. Where the seam allowance is wide trim the edges a little before starting, as the second turning must be within the fitting line, otherwise the finished garment will be a trifle larger than intended. Tack both prepared edges on paper with a space of ⅜in. to ¼in. between. This space should correspond in width to the amount taken from each edge when making the second turning (Fig. 2). Check the width frequently while tacking to keep it even. Choose a thread, stranded cotton or embroidery silk, heavy enough to be effective but not clumsy, and follow the directions under the illustrations. Some workers prefer to sew from the right side, but others like to tack the wrong side uppermost, as the beginning or ending of threads is easier this way. Two varieties of faggoting are illustrated, Figs. 3 and 4, a, b, c. d,. but there are others which may be known and preferred. Be sure to leave the stitches loose enough to allow the seam to remain the same distance apart when the paper is removed, but do not make them so slack that the space is increased. Even spacing of the stitches and of the edges of the material gives the character to this work.

Satin Stitch Seam

The curved seams on the bodice part of slips, etc., can be made joined by a satin stitched seam. Turn a narrow fold to the wrong side of one piece of the material; overlap it at the seam line on the corresponding piece. Tack with embroidery cotton, making small stitches so that the material does not slip and also to pad a little for the satin stitch. Keep the satin stitching very even, close together and quite narrow, putting the needle into the single material close up to the folded edge (Fig. 5a). Bring the needle out at the right width from the fold; about ⅛in. is usually found effective. Press the seam from the wrong side to raise the stitching and trim off the surplus raw edge on the wrong side (Fig. 5b). This finish is not suitable for materials which fray very easily.

Herringbone Stitch

Herringbone stitch makes a decorative feature of skirt bodice joins on garments of thin silk or sheer materials. Turn a narrow fold on to the wrong side and lap over the other section for about ¼in. to ⅜in. Tack and then stitch along each edge with closely-worked herringbone stitch.

FAGGOTING SEAMS

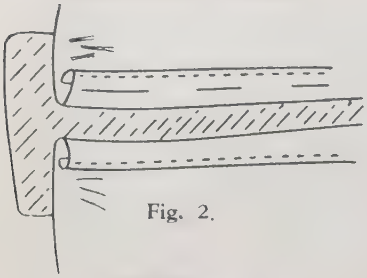


Fig. 2.

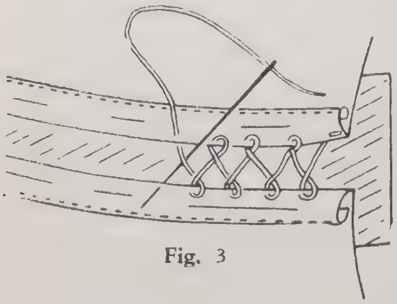


Fig. 3

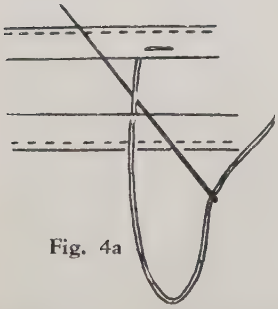


Fig. 4a

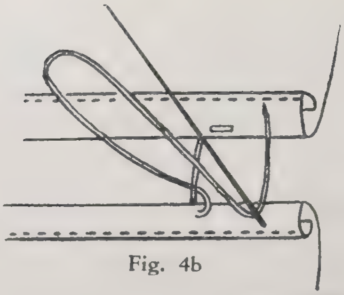


Fig. 4b

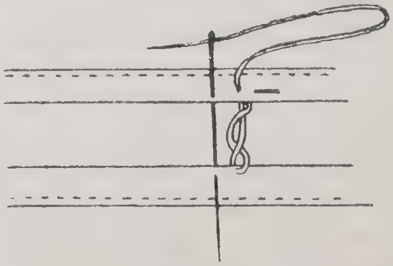


Fig. 4c

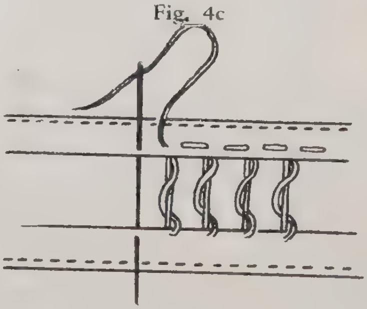


Fig. 4d

SATIN STITCH SEAM

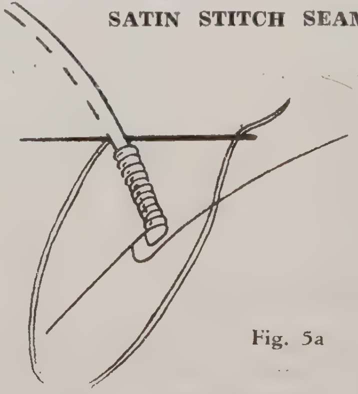


Fig. 5a

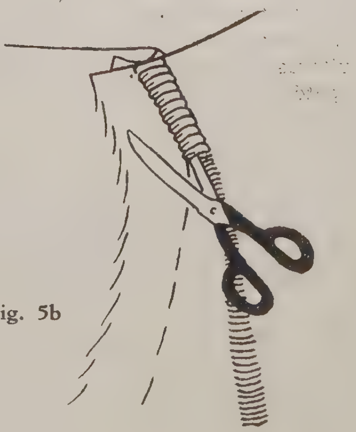


Fig. 5b

HERRINGBONE STITCH

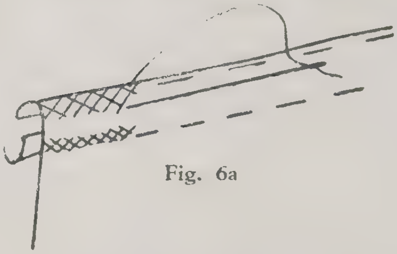


Fig. 6a

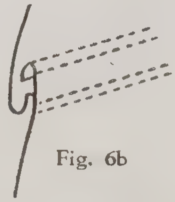
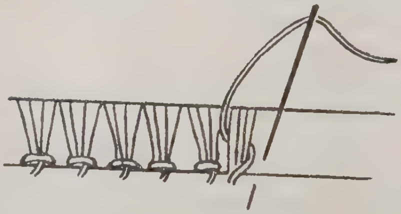
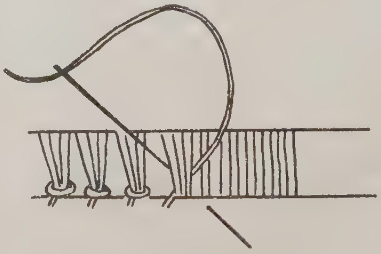
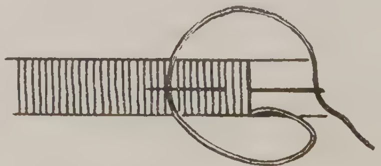


Fig. 6b

HEMSTITCHING


Method A. Fig. 7


Method B. Fig. 8


Method C. Fig. 9, Step 1

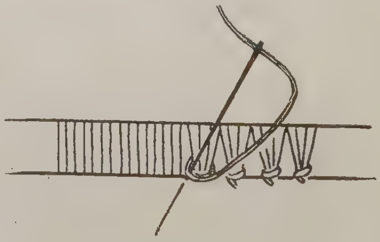


Fig. 9, Step 2

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BOX 195, HASTINGS.

The thicknesses of material between the two rows of stitching give a shadow effect, and if the material is thin and the stitches closely worked and pulled as tight as possible without puckering, a row of tiny open holes is formed which resembles hemstitching (Fig. 6a). Double-back stitch is a variation of herringbone stitch which will give two close rows of stitching with a cord-like ridge of material between (Fig. 6b).

Hemstitched Seams

Hemstitched seams will have to be done at the machine or dressmaking shops, as curves cannot be hemstitched by hand. They are easy to do, as careful tacking for the guidance of the machinist is all that is needed. To prepare the work for the shop, tack a plain seam, then turn both raw edges to the same side and tack again, or alternatively turn a lapped-over seam on the right side. The hemstitching should be made on the folded edge of the seam on the right side and the raw edges on the wrong side trimmed off close to the stitching. Another method is to place one piece of cloth over the other and tack along the seam line. The hemstitching follows the line of tacking and raw edges on right and wrong sides are trimmed back to the row of stitching. A word of caution—machine hemstitching is often made too tight, dragging the seam out of shape, and it is as well to make sure the work put out by the chosen shop is of good quality and does not have this fault. Damp pressing will remove some of the puckers, but will not restore the correct length to a seam which has been shortened because the tension of the hemstitching machine was too tight.

Hems

Hems for underwear are usually made by hand. When narrow plain hems are required use fine silk or silk substitute and pick up one or two threads on the single material and take a longer stitch on the folded edge. A cardboard gauge is a help in keeping the hem even. Cut a right-angled notch in light card at the desired width down from the top edge. Wider hems on curved edges can be finished in two ways; by gathering the edge and then hemming, or by pleating on the fullest curve. The pleats should be felled down, taking care not to let the stitches show through on the right side.

The future is not ours; perhaps it never will be. If it comes, it may come wholly different from what we have foreseen. Let us shut our eyes, then, to that which God hides from us, and keeps in reserve in the treasures of His deep counsels. Let us worship without seeing; let us be silent; let us abide in peace.—Fenelon.

Decorative Hems

Simple embroidery stitches in stranded cotton or silk are quickly worked. They are very attractive on plain materials, especially if contrasting colours are used, and they can easily be designed by the worker; one or two edgings are illustrated as a guide.

Hemstitching

When the edges run straight on the grain of the material, as in the hem and top edges of a plain-cut slip, hand hemstitching makes a good finish. Use sewing silk substitute or two strands of embroidery cotton in a shade slighly darker than a self-coloured material, or to tone or contrast with one of the colours in patterned stuff. Pull several threads along the line the stitching is to take, turn hem, and tack as close to the pulled threads as possible. Start from the left-hand side, holding the hem in the left hand. Insert the needle in the hem and secure with one or two small stitches. Take up a small bundle of threads and insert the needle in the hem to the right of threads ready for next stitch (Fig. 7). Some workers follow the other methods illustrated in Figs. 8 and 9 (two steps).

Curved hems will have to be machine hemstitched. Prepare the garment for the machinist by tacking the hem along the line the stitching is to follow.

Edge Finishings

Lace is much used for finishing neck and sleeve edges, although of recent years machine-made laces have been very difficult to obtain. The hand-made tatting which is so popular at the moment is particularly suitable when done in fine cottons and narrow widths. To apply tatting turn a very narrow hem and whip the lace on the folded edge. Machine-made lace can be used in several ways, some of which are illustrated. Fig. 10 shows the lace being appliqued to the edge with satin stitch; buttonhole stitch can also be used in this way. Tack the lace in place and work closely to give a firm edge, press, and trim off the surplus raw edge on the wrong side. Figs. 11 and 12 give two ways of applying lace and finishing the edge in one operation.

Fig. 13 shows a narrow decorative hem with lace seamed to edge. Hold the lace towards you when seaming and ease slightly with left thumbnail.

Bias Bindings

Binding makes a good edge finish and has an advantage over lace as it wears as long as the garment, whereas lace often has to be mended or replaced. Self bindings or a plain con-

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EDGE FINISHINGS

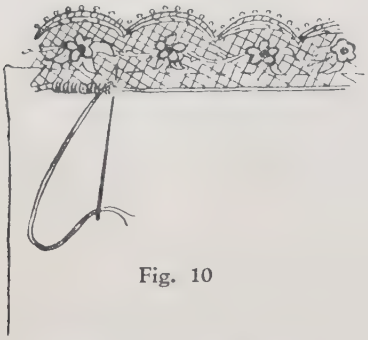


Fig. 10

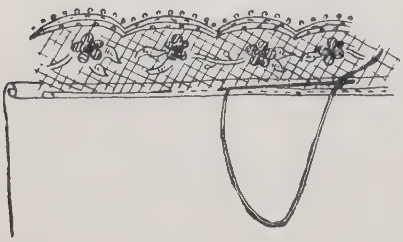


Fig. 11

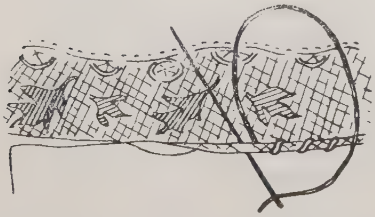


Fig. 12

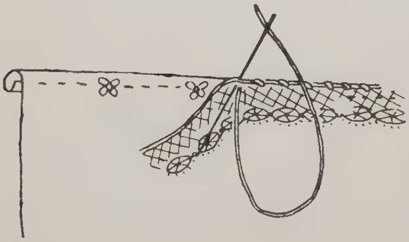


Fig. 13

SHELL EDGING

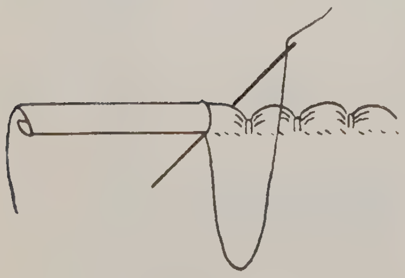


Fig. 14

NEEDLE POINT EDGING

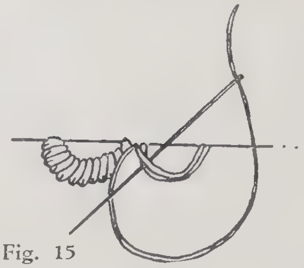


Fig. 15

TUCKS

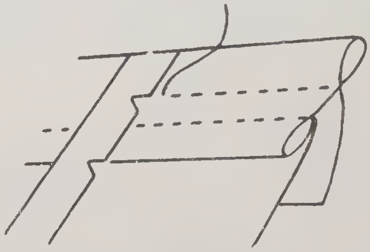


Fig. 16—Plain tuck.

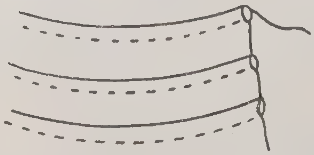


Fig. 17—Pin tuck.

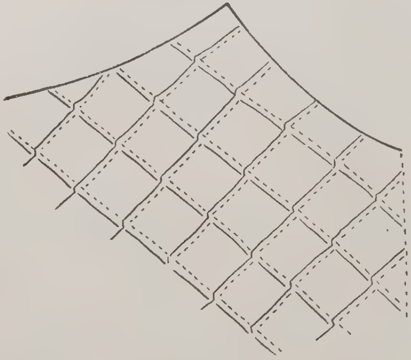
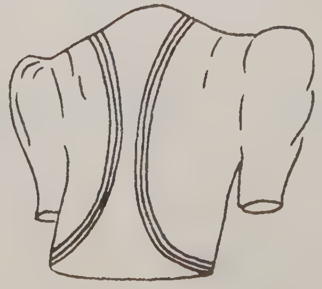


Fig. 18—Cross tucking on section of yoke.



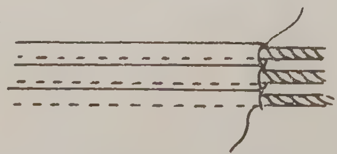


Fig. 19—Corded tucks.

FRILLS AND FLOUNCES

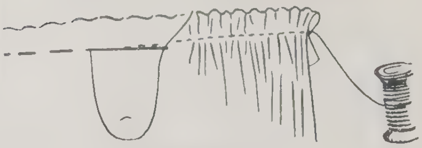


Fig. 20

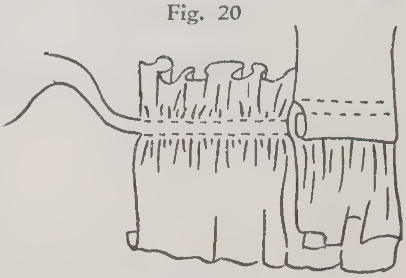


Fig. 21

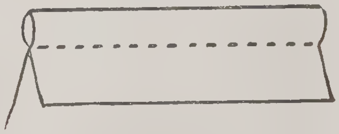


Fig. 22a

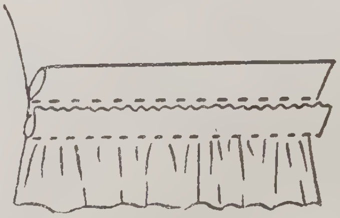


Fig. 22b

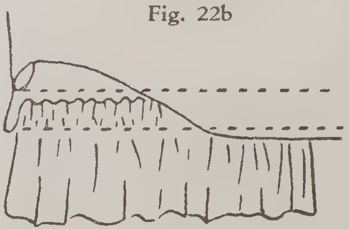


Fig. 22c

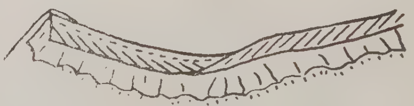
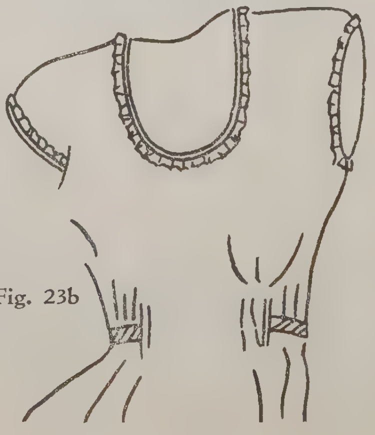


Fig. 23a—Details of frills.

Fig. 23b



trasting colour to accentuate one tone of figured materials can be used. Cut strips of chosen fabric about ½in. to ⅝in. wide on the true bias, keeping an even width. Stitch to right side by machine, press flat, and hand-hem on the wrong side; avoid letting the stitches show on the right side, as they detract from the finished effect. On fine materials the strips of binding can be doubled and the two raw edges stitched down to the right side, leaving a folded edge to be hand-hemmed. Mitre the binding at sharp corners such as collars or the points of underslips where shoulder straps are attached.

Shell Edging

A dainty edging for fine materials is shown in Fig. 14. Turn a narrow hem about ⅛in. wide. Make three hemming stitches, then take a stitch right over the hem, pulling it down, and take another stitch over, also pulling tight. Continue with three hemming stitches and two over, keeping the "shells" or scallops even. On some materials the hemming stitches may be omitted; slip the needle under the hem between the sets of drawn-down stitches.

Needle Point Edging

Fig. 15 shows a light but durable edging worked in stranded embroidery cotton. Turn the narrowest possible hem or roll the edge and tack. Fasten the thread securely and take a stitch at the edge, slightly less than ¼in. distant, leaving a loop of thread between. Turn to first stitch and insert the needle again, leaving another thread loop over the first loop. Work back over the loop with a buttonhole stitch. Continue making thread loops and buttonholing over along the edge to be finished. Two strands of cotton threaded in the needle will be sufficient on most materials.

Tucks and Tucking

Tucks can be used to regulate fullness and for decorative effects.

Graduated tucks made to radiate from neckline or waist will ensure a neat fit and also add interest. Taper the stitching carefully at the point to leave no unsightly bulge, and make sure that the end of the thread is firmly secured. When these tucks are machine made draw both ends of thread through to one side and tie before snipping.

Plain tucks should be made on the straight of material, evenly spaced, and running parallel. Make a gauge of light card with two right-angled notches, one the width of the tuck below the top of the card and the other at the point where the fold of the next tuck should lie (Fig. 16). On some materials threads can be pulled to mark the position of stitching. Pull the first thread where stitching should come and of the right length for tuck, pull a second thread twice the width of the finished tuck, fold, and stitch where the two pulled threads lie on top of each other.

Pin tucks can be straight or curved to follow the line of the garment section. Mark the line carefully before stitching and make sure that each tuck is parallel to the edge of the pattern and the next tuck (Fig. 17).

Cross tucking (Fig. 18) is a pretty way of decorating the brassiere top of a petticoat or the bodices of night wear. Make the tucks before cutting out the section of material.

Shell tucks are used for decorative features and are worked similarly to the shell edging described earlier.

Corded tucks (Fig. 19) are good for bed jackets and dressing gowns. Run the tucks by hand over the cord or make the tucks first and insert the cord with a bodkin.

Gathers

Where parts of a garment have to be gathered to fit another part, two rows of stitching are more satisfactory, though one is often used. If there is much fullness to deal with, the gathers should be stroked to make them lie flat and even. Draw up the two threads tightly and wind them round a pin inserted at the end of the rows of stitching. Hold the gathered part tightly in the left hand and draw the gathers, a few at a time, over the left forefinger, with the right hand. Nip each gather firmly with the left thumb to crease the material and mark the gather. Remove pin and loosen thread and arrange the gathers evenly in the desired position. Rethread the needle and fasten off the rows of stitching at the right length.

Frills and Flounces

Underslips for wearing with thin frocks or evening dresses are sometimes made with a deep flounce at the hem to give a little extra swing to the frock. A narrow frill at the hem of a nightdress makes a very attractive finish and tiny frills around neck and sleeves can substitute for the unprocurable lace. Frills or flounces are usually made one and a half times the length of the plain edge to be dealt with, so first measure the hem or line where frill is to be joined to the garment. Cut the flounce and join pieces with narrow French seams. Finish the lower edge with a narrow plain hem or in any other way you prefer. Mark at half, quarter, and eighths. Turn the top edge down once on the wrong side and make two rows of gatherings. To make the gathers thread the needle without breaking the cotton off the reel. Take even stitches about ⅛in. from the fold, keeping the needle in the fabric and slipping the stitches off occasionally (Fig. 20). Finish off very securely and snip the thread from the reel when the stitching is completed. Make a second row of gathering ½in. below the first. Keeping the cotton on the reel will make sure the gathering thread is in one piece. Mark the garment to correspond with the divisions on the flounce and pin the two sets of marks together. Distribute the fullness evenly, and tack and attach to garment exactly on the top line of the gathering by machine stitching (Fig. 21) or simple decorative hand stitch. If you prefer to make the flounce without a heading, run the gathering stitches without turning down the top edge. It may be attached in two or three different ways. It can be placed on the edge of the slip by fell, French, or plain seam; if the last is used a narrow crossway facing will be needed to cover the raw edges of garments and flounce. Another neat way to add a flounce is by making a tuck in the garment. Stitch-tuck the desired width wherever the flounce is to be attached; slip the raw edge of the flounce under the tuck, tack the tuck over the flounce, and stitch on the edge of the tuck. When the flounce is to be attached at the edge of a garment under a tuck, make a crease ¾in. from the edge of the garment on the right side. Measure ¼in. from the crease and stitch a tuck (Fig. 22a). Place the wrong sides of flounce and garment together and make a plain seam. Turn the edges of the seam upward and flatten the tuck down over the seam (Fig. 22b). Tack and stitch close to the edge of the tuck (Fig. 22c).

Frills for the hem of nightdresses should be about 1½in. to 1¾in. wide when finished. If the selvedge of the material is used for the bottom of the frill no hem is required. Narrow frills (Fig. 23a) about ¾in. wide for neck and armholes can be set on with crossway binding as illustrated in Fig. 23b. A picot edge worked at the machine shop makes an attractive finish. Cut strips twice the width and half the total length required, and have them hemstitched down the centre. Cut down the hemstitching to give the picot edge and join with narrow French seams.

Darts

The "tailored" type of garment calls for the use of darts and care should be taken in adjusting them at the points. The stitching should gradually slant along the fold of the material until the width of the fold dwindles to nothing (Fig. 24, left). A too sudden ending of the stitching leaves ugly bulges which should be avoided (Fig. 24, right).

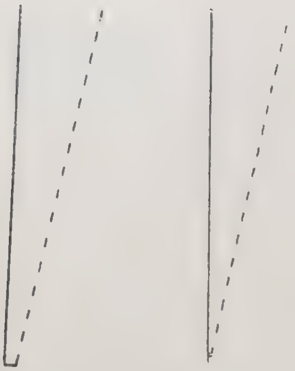


Fig. 24—To stitch a dart: Left—Correct; will give smooth finish. Right—Incorrect; will leave bulge at point of dart.

Smocking

A particularly charming way of regulating the fullness in night wear is achieved by smocking, but it is unsuitable for underwear, as it is rather bulky for these garments. Rows of gathers are run absolutely straight and with each stitch falling directly in line with the ones above and below. Transfers of smocking dots can be obtained and should be ironed off on the **wrong** side of the material, because if the marks show on the finished work the effect is spoilt. For this reason make the transfer marks as faint as possible on thin materials. Rows of running stitch begun with a large knot are taken through each dot. The ends of the threads are left free until all the gathering has been done. All the threads are drawn up and tied together in pairs. This is the uninteresting and tedious part of smocking, but unless carefully done the final result can easily be ruined, as evenness and regularity are the characteristics of this work. The material should now look as if finely pleated and is ready for the smocking stitches, many of which are variations of stem stitch and are easily worked. The top rows of a pattern usually need to be firm to hold the gathers in place and regulate the fullness, but the bottom rows may be formed of stitches giving a broken line and allowing the fullness to spread. Choose the pattern of the smocking to suit the position on the garment; honeycombing is the most elastic, and patterns of closely-worked zigzags in stem stitch "give" least. Start at the top and work from left to right, keeping the lines of stitching very straight.

Lace Insets

Lace motifs, tatting medallions, or flower shapes cut from net and inset by applique make dainty trimming. Tack the lace on the right side and work satin stitch closely over the edge. Turn the work and cut away the foundation material with sharp scissors, close to the satin stitch, in the same way as for lace edging (Fig. 10)

Embroidery Decorations

On plain materials simple embroidery designs make attractive decorations for underwear. The designs used should be small and light in character if a dainty effect is desired. Commercial transfers are to be obtained at most shops dealing in these goods, but simple motifs can be often originated or copied by the worker. Draw or trace the design on white paper making heavy black lines. Lay the material over the outline and trace with a soft pencil. Do not mark heavily or the lead will soil the embroidery cottons. Outline, lazy daisy, buttonhole, satin, and cross stitches are all suitable for working the small decorations, using two, or at most three, strands of embroidery cotton in the needle.

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MARY'S AT HOME

HOW lovely your garden sounds. I hope you get just the right quantity of rain and very little, if any, wind. A garden wherein you can walk and think and take your leisure is a truly lovely thing.

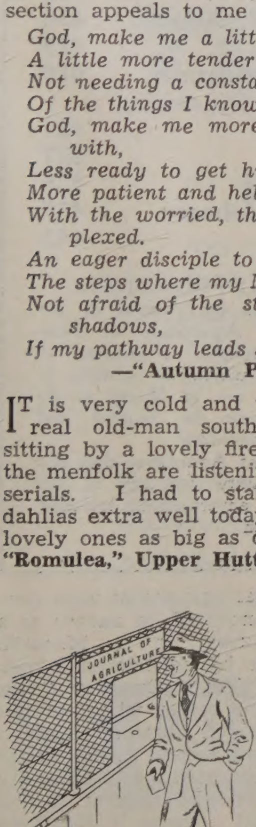
—"Jonathan," Clarence Bridge.

I AM very interested in the "Good Neighbour" section and enjoy reading the pleasant thoughts conveyed by its members. Could I join, please? I have been working on a farm since 1944 and love the life. I am sending you one of my favourite poems—the poetry in the "Good Neighbour" section appeals to me especially.

God, make me a little bit kinder,
A little more tender and true,
Not needing a constant reminder
Of the things I know I should do.
God, make me more easy to live with,
Less ready to get hurt and vexed;
More patient and helpful in dealing
With the worried, the sad, the perplexed.
An eager disciple to follow
The steps where my Master has trod,
Not afraid of the storms and the shadows,
If my pathway leads straight to God.

—"Autumn Pal," Southland.

IT is very cold and wet tonight, a real old-man southerly, and I'm sitting by a lovely fire writing while the menfolk are listening to the radio serials. I had to stake and tie my dahlias extra well today—I have some lovely ones as big as dinner plates.—**"Romulea," Upper Hutt.**



PLEASE may I join your "At Home"? My husband has just paid five years' subscription in advance as I enjoy these pages so much. I am looking forward to many hours of happy reading.

I HAVE followed and enjoyed your pages for a long time, but only now have I plucked up sufficient courage to enter for the competitions. I am sure it must be lots of fun and they certainly achieve some bright and snappy responses.

—"Amity Hope," Hastings.

I WOULD like to join your circle of "Good Neighbours." I couldn't have thought up anything at all for your "Favourite Flower" competition, as I like every flower best and in its season. My writing at the moment is somewhat hindered by the confident presence of my tomcat on the table!—**"Wild Country," Te Pahu.**

HOW well I can picture "Mary's" view, for I have known it, too. I expect there are still smoky coal hulks dotted about the harbour and the little Cobar making trips to the Bay. And at night all the lights twinkle like strings of beads encircling the hills.—**"Alison Grey," Tauranga.**

I ECHO everyone's sentiments concerning the "Good Neighbour" pages. They are really inspiring and to know that there are so many lovers of poetry and beauty gives us a feeling of security and an assurance of a happy future for our little ones at a time when so much of the beauty of living is obscured by national misunderstandings.

—"Native Flower," Waipukurau.

YOUR room must be delightful, and I've had many peeps at it since the "Journal" arrived. How nice of you to write and tell the "Good Neighbours" all about it and to have it photographed for us to see. I also like a "room with a view"—it makes me think of Noel Coward and the song in which I liked him best. I can picture your lovely view—no wonder you glean nice thoughts for "Good Neighbours" in such pleasant surroundings.

I was very pleased with the sketch accompanying my paragraph in the "At Home" pages. It flatters me, though years ago I looked like that! I think your artist is extremely clever and enters into the spirit of the subject very happily in all the sketches.—**"Vista," Waikato.**

WE went to Morere for our holiday this year. Have you ever been there? It's a glorious place for a lazy, refreshing holiday. The hot baths are only half a mile away from where we stayed, and the baths and the bush are the chief attractions. The bush by electric light is a scene of wondrous beauty. We loved it so much that we are going back next year.

I see that another Wairoa reader, "Country Lifer," gained a first prize. The flower competition was very nice, but I would find it rather difficult to choose any one flower as favourite. All in their turn, from the first yellow jonquils in July to the chrysanthemums in May, have their own special charm and bring their own joy and wealth of colour and perfume.

—"Alix," Hastings.

A GOOD neighbour lent us some "Journals"—how we enjoyed them. Today our own copy arrived. May I join your circle? I feel it will be a great interest. We have just purchased a farm. Everything is so different here, not a tree, a shrub, or hedge, just one poor neglected rambler trying to raise its head and live through the dry weather. But we have land—

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acres of it—and my dream is to make in this bare place a home surrounded with all the fragrance and beauty of a garden.—**"Lonely Londoner," North Auckland.**

THE weekend before last we spent a whole Saturday picnicking far out in the country. We left in the early morning and returned home just as the twilight smothered the flaming gold of sunset into velvety darkness. We had a lovely peaceful day and boiled our billy on the flat white stones at the edge of the swiftly-flowing river. All day long the larks enchanted us with their beautiful melodies and the trees on the opposite shore rustled in accompaniment. I think thousands of thistle "kisses" must have drifted high over my head while I lay watching the shadows and the clouds in the sky.—**"I.J.S.," Otaki.**

A beautiful gully of native bush on our boundary caught alight recently and it took many hours of weary work to conquer the fire. The flames spread across the paddocks and I had visions of our farm disappearing, but fortunately our pigs had been rooting along the fence line and this had made a small firebreak, so that the men were able to beat out the flames as they came across. Ours being the nearest house I was kept busy making buckets of tea which had to be carried to the top of a steep hill. One bright spot in the day was the wonderful spirit of co-operation and help that showed itself. I think country people are "tops"—I don't think they could ever fail one another, whatever the crisis.—**"Double Dee," Tuakau.**

YOUR paragraph in the January issue, "Martha," might have been written by myself, it expresses so exactly how I feel some days. It's hard, isn't it, to know how far to go when chastising one's children. We know discipline is very necessary, yet children are more outspoken these days and I think they are better for it —within reason, of course. My eldest, a little girl of four and a half, is a good example. She said, "Oh, **don't** talk to me like that, Mum," in such a lovely, soft little voice that I couldn't reprove her further, for she was only making a statement of fact, but to an outsider it would have sounded cheeky, no doubt.

I agree with you, too, that we don't trouble to praise our neighbours enough.—**"Green Acres," Whangarei.**

I AM wondering how many of our "Good Neighbours" have suffered from the terrible fires raging up north. Today in mid-Canterbury there is a continual haze all round and we wonder if this is the fringe of the smoke from the fire-swept north, as we have also experienced such haze from Australian bush-fires. Although we on the plains have our "old man" nor'-westers to contend with, we are saved the havoc caused by raging fires. I am sure all the "Good Neighbours" down this way feel deeply for those who have lost their personal property and the beauties of native bush and scenic reserves through ravaging fires.—**"Riebel," Wheatstone.**

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The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

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ABOUT a year ago one of your contributors enquired, in answer to a competition query, if a Monarch butterfly could be considered a pet. My answer is "Yes." One day I was trimming a low hedge when, to my delight, a Monarch butterfly made a leisurely appearance and settled under my nose. It permitted me to place my finger beneath it and raise it as one does a pet bird. There it remained for several minutes until it made a quiet departure.—**"Al Azir," Auckland.**

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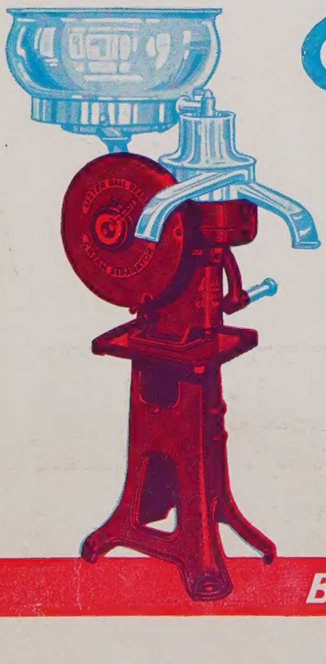

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